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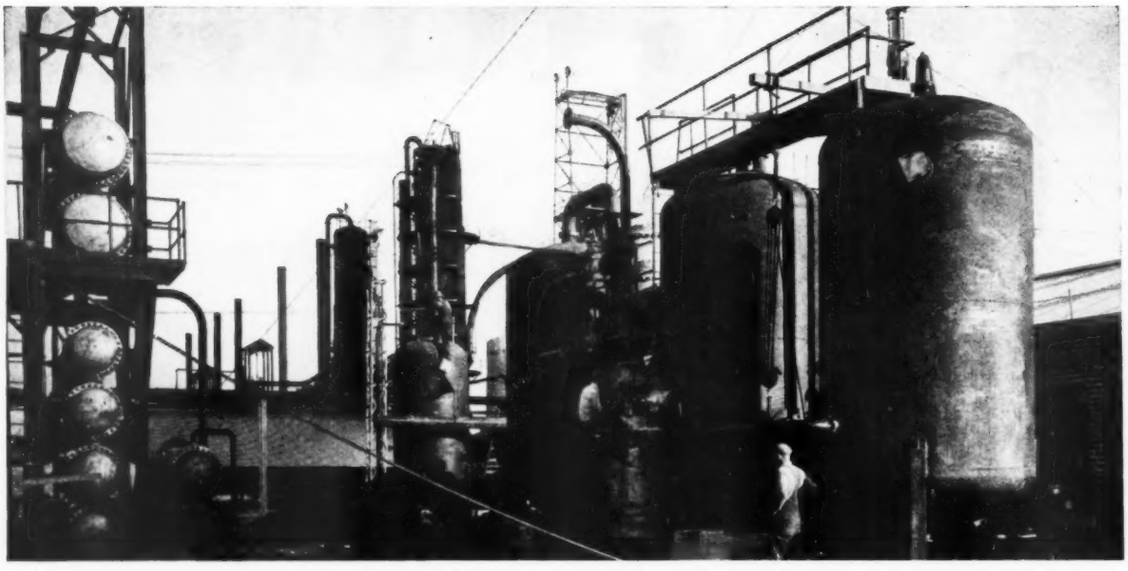

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PLANTS AT DALLAS AND HOUSTON

States Plan Lower Output During April

DEVELOPMENTS the past few days indicate that April crude oil production will be less than that of March which is certain to be greater than any previous monthly period in the history of the industry. An increase of 147,282 barrels daily in crude production over the past two weeks with steady increases in both crude oil and gasoline inventories has served to bring a note of caution into discussions as to future trends in crude production and refinery operations.

The Texas Railroad Commission, following a hearing on Saturday at Austin, announced that the April allowable would be 1,348,964 barrels daily, a decrease of 49,550 barrels compared to the March 1 allowable and 82,005 barrels less than the March 16 authorization. This state allowable will still be 51,064 barrels daily in excess of demand as estimated by the Bureau of Mines but the differential between the two will be less than during any period in several months. The producers of the state had presented nominations seeking a daily production of 1,636,019 barrels daily in April.

The railroad commission in reducing the allowable pointed out that crude oil was going to storage in the state indicating a supply in excess of current demand. With new wells being completed at a rapid rate in all sections of the state there was some question as to whether a substantial reduction in April production will materialize in the state despite the ruling of the commission.

While final plans had not been announced for Kansas and Oklahoma at this writing, it was believed that the state regulatory bodies in those states would also attempt to bring about small reductions in production in April. The Bureau of Mines April recommendation for Oklahoma will be 609,600 barrels daily and Kansas 183,000 barrels. It is understood that the commissions of the two states will return to the former policy of keeping their recommendations in line with those of the government bureau, which if enforced, will mean that their April production will be slightly less than in March.

Production 3,456,171
Increase 76,622

Field reports continue to show important extensions to existing fields in all of the important producing states. New sand discoveries were made in California and the Gulf Coast with a new producing area opened up in southwestern Arkansas. In Oklahoma, a number of operators are directly interested in the completion of an extension test in the Langston field of Logan County with a large initial flow of high gravity crude. There were no changes of general importance in refinery markets. Predictions of generally higher price levels for both crude and refinery products are general in eastern financial circles. Practically all refining areas reported an improved seasonal demand for motor fuels from plants to bulk stations.

Daily Average Production for Week

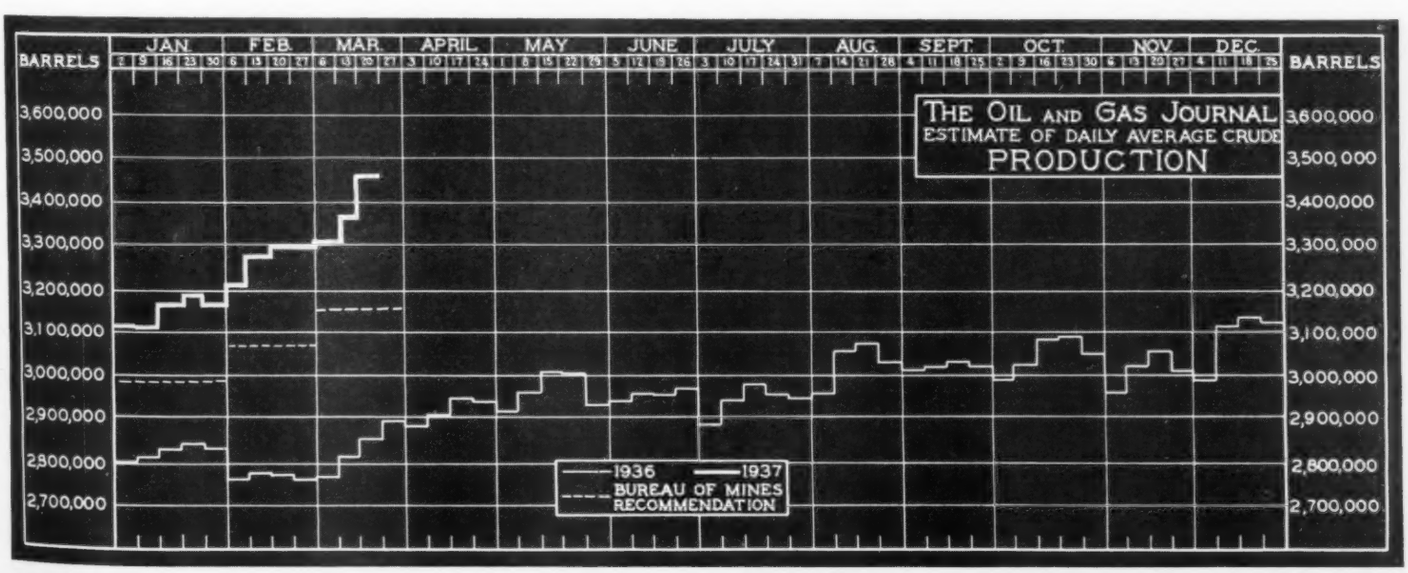
	Mar. 20, 1937	Bur. Mines Mar. est.	Mar. state allowables	Mar. 13, 1937
Oklahoma City	155,250	.....	.....	141,750
Seminole-St. Louis	88,000	.....	.....	89,000
Remainder of State	414,200	.....	.....	385,175
Total Oklahoma	657,450	590,700	620,460	615,925
East Texas	459,187	.....	.....	458,700
West Texas	208,050	.....	.....	208,389
North Central Texas	100,650	.....	.....	99,296
Texas Panhandle	82,697	.....	.....	73,489
East Central Texas	122,389	.....	.....	119,550
Gulf Coast—Texas	335,283	.....	.....	327,197
Southwest Texas	106,945	.....	.....	107,048
Total Texas	1,415,201	1,256,600	.....	1,393,669
North Louisiana	68,272	.....	.....	67,580
Gulf Coast—Louisiana	178,000	.....	.....	173,000
Total Louisiana	246,272	240,000	236,000	240,580
Santa Fe Springs	44,700	.....	.....	45,100
Long Beach	61,150	.....	.....	61,500
Kettleman Hills	77,800	.....	.....	76,500
Remainder of State	408,600	.....	.....	409,500
Total California	592,250	570,900	*551,100	592,600
Kansas	188,325	178,000	186,968	183,275
Arkansas	27,135	28,500	.....	26,650
Eastern Fields	114,250	114,700	.....	116,000
Michigan	37,978	30,300	.....	35,170
Southeastern New Mexico	102,130	87,150	102,155	102,130
Rocky Mountain area	75,180	62,150	.....	73,550
Total United States	3,456,171	3,159,000	.....	3,379,549

*Recommendation of Central Committee of California Oil Producers.

Crude Oil Stocks in United States

(BUREAU OF MINES ESTIMATES)

Week ending March 6, 1937	289,611,000
Week ending February 27, 1937	288,121,000
Week ending March 7, 1936	311,349,000



Refiners Prepare for Peak Year With New Processes

By C. O. WILLSON

Three hundred fifty companies and individuals operating 471 refineries in the United States are closing the first quarter of what is certain to be the most active manufacturing year in petroleum history.

Outside this country the operators of 300 refineries are likewise establishing new production records in response to an increased demand coming from all the continents.

World daily crude oil production has passed the 5,000,000-bbl. level since the first of the year. Part of this output is consumed without being refined but it is probable that before the end of the year, due to expanding markets, refiners will also have their plants on a 5,000,000-bbl. per day basis.

The refinery statistical situation in this country can be briefly summarized. Last year refiners ran 1,068,134,000 bbls. of crude to their stills and natural gasoline manufacturers produced 42,041,000 bbls. of their product. From this crude oil and natural gasoline refiners supplied a domestic demand of 481,591,000 bbls. and exports of 27,831,000 bbls. These figures include a small quantity of benzol obtained outside the industry and blended with the petroleum product before final distribution.

Most estimates as to 1937 requirements are based on a minimum increase in demand of 8 per cent. Prognosticators believe this estimate conservative, assuming that labor difficulties do not disrupt the anticipated manufacture of 4,750,000 motor vehicles and business conditions continue to point to a maximum use of all the old and new vehicles.

This in effect means that domestic refiners must gear their operations to a demand of approximately 550,000,000 bbls. of motor fuel this year, all of which they will be expected to refine with the exception of less than 50,000,000 bbls. to be accounted for by natural gasoline and benzol. This total represents an increase of 144,000,000 bbls., or 35 per cent, over the depression low of 1933.

Interpreted in terms of crude runs to stills daily, United States refiners will have to average about 3,200,000 bbls. daily at their plants this year while foreign operators take care of an additional 1,800,000 bbls. daily. The peak domestic operations of the summer months may be in excess of 3,300,000 bbls. daily.

OPERATING NEAR CAPACITY

The question is often asked as to whether the refining branch of the industry is prepared to take care of this tremendous demand for motor fuels and with corresponding gains in many of the other petroleum products. The answer is indicated in the plant survey published elsewhere in this issue.

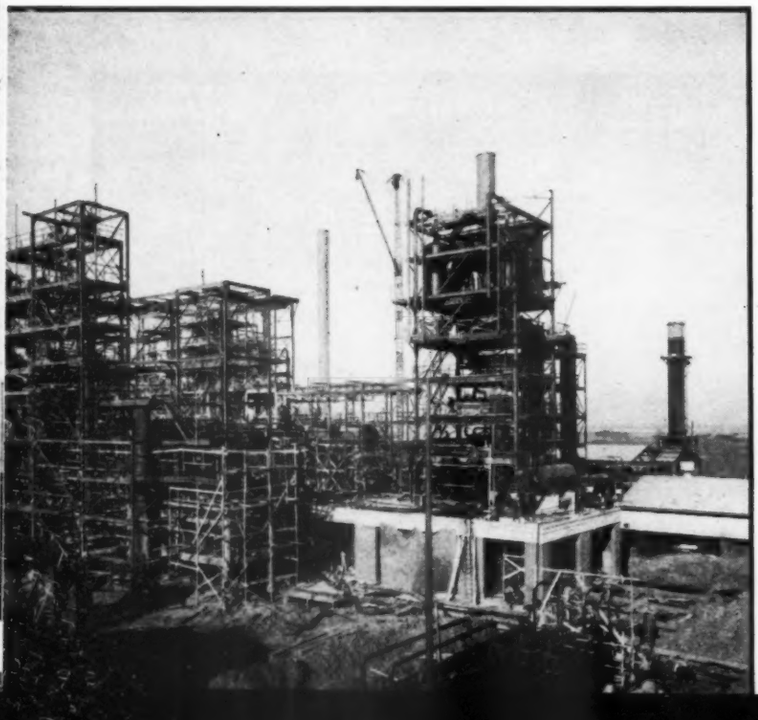
While this annual survey shows that the daily crude oil capacity of the operating plants exceeds 4,000,000 bbls. with an additional 200,000 bbls. daily available from a large number of small shutdown plants, these data might easily be misleading if not interpreted in their true relation to available efficient refining capacity. The shutdown plants can be dismissed as of no consequence in gauging present and future refining facilities. With rare exceptions plants that are shut down at this time will never be operated again.

Refinery Engineering Section, including personnel and operating data, starts opposite page 80

A similar situation is found in regard to the 800,000 to 900,000 bbls. daily excess crude oil capacity available at operating refineries. A detailed check will show that the bulk of this supposedly excess capacity comes from two classes of plants. In one class are a large number of small local refineries located in the states which produce most of the crude oil. These plants were usually built during the flush production period of a new producing area and never operated at rated capacities except for a brief period. As the field production declines and major pipe companies furnish a ready market for all of the crude oil, these local plants reduce their crude runs to stills until they shut down completely. This type of operation is rarely a permanent contribution to the industry's refining facilities.

Besides these local plants there are a number of larger refineries operating at part capacity. These are plants whose operating position has been changed due to developments within the industry or within the operating positions of companies which own and operate them. Expansion of refinery capacity at the Gulf Coast, which has reduced the crude runs to stills of plants owned by the same or affiliated interests along the East Coast, is a case in point.

This constant shift in capacity of local plants and the more important changes in the operating status of major refining units in effect means there is now very little excess capacity—worthy to be operated as such—within the refining industry at this time. Many operators will be faced with necessity of operating their plants beyond rated capacities within the next few months. This in part reflects the dearth of expansion during the depression period when the phenomenal increases in demand over the past two years and that in prospect for the coming year were not accurately gauged.



Construction view Atlantic Refining Co.'s new 20,000-bbl. plant at Atreco, Tex.

TECHNICAL PROGRESS

While major expansion and reconditioning work at refineries are necessary and are now under way at many points, this does not mean that refiners as a group have been standing still. In fact those charged with the responsibility of refining the industry's raw material over the past two years can point to more accomplishments in the form of efficient operation and new and improved products than in any similar period in the history of the industry.

The activity known to be going on in the research and development departments assures that future achievements will overshadow anything in the past. This includes the work of concerns outside the refining industry which are playing an increasingly important part in the perfection of new processes and the design of new equipment and supplies which have made possible modern refinery operation.

SYNTHETIC PRODUCTS

The changes that have taken place in recent years in refinery operations have been motivated not only by the necessity of handling more crude at lower costs but also by the fact as one

Standard Oil Co. of Indiana's 103,000-bbl. plant at Whiting, Ind. One of the largest manufacturing units in the refining industry

major operator explains that all products have to be "made." He had reference to the fact that practically all finished products now have to comply with more and more rigid consumer specifications. This is in contrast to the situation in the early history of the industry in which manufacturing operation consisted in the simple physical separation of crude by atmospheric distillation and the consumer adapted his requirements to the products available.

In modern day operations there are exacting specifications from the high octane and volatility specifications of aviation gasoline to the viscosity and carbon content requirements of residual fuels. Diesel fuels, particularly in foreign markets now have to meet minimum specifications which has meant that many refinery cuts are no longer suitable for that market. The same situation applies to furnace oil and other fuels. The net result of this situation is the rapid development of the synthetic phases of refining which are certain to become of increasing importance. This is also the basis for the development of a petroleum chemical industry.

COMBINATION OPERATIONS

In the crude distillation and cracking phases the expansion of combination operations has been outstanding over the past year, with several units scheduled for installation at both domestic and foreign refineries this year. The fact that these units have increased in flexibility has added to their attractiveness to plant operators.

With major savings in capital investments and labor and fuel operating costs, the first installations were restricted as to the charging stocks that could be used in one unit, with little flexibility as to the grades of products to be derived. Crudes of wide variation in specifications are being used now, with the yields of finished products changed from time to time to meet market requirements. Improvements in automatic control instruments, heaters and heat-exchanger equipment are outstanding in the design of these units.

SOLVENT-REFINED LUBRICANTS

In the lubricating oil end, solvent refining, which in many cases is accompanied by solvent dewaxing, has been expanded to the point where it has become the controlling factor in determining the specifications of finished lubricants. Elsewhere in this issue a survey shows 28 installations in this country and 19 in foreign countries.

The capacity of these domestic solvent units now aggregates approximately 50,000 bbls. daily. With the production of finished lubricants in this country to total approximately 90,000 bbls. in 1937, these data indicate that approximately 40 per cent of the lubricating oils will be solvent refined this year. Several of the larger refining organizations have increased their solvent-refining and dewaxing facilities to cover their entire lubricating oil operation, except in the manufacture of a few products in which the solvent operation is not desirable.

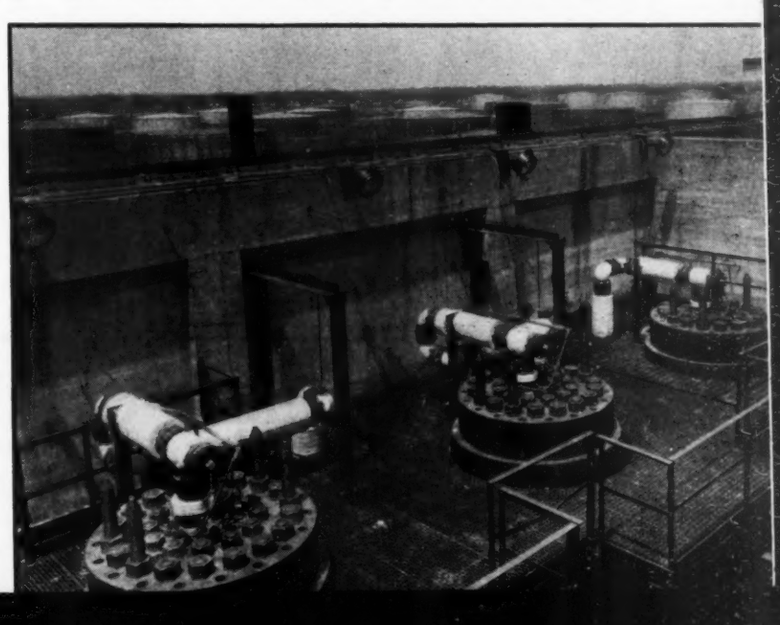
The improvement in these solvent-refined oils rests largely with the higher viscosity index which meets the requirement for lighter oils demanded by the motor car. Economy over older methods is claimed in the case of operations where a large capacity is possible.

POLYMERIZATION

Polymerization of refinery gases, after a commercial trial of two years has been accepted by the refining industry, although a general application probably will not materialize until extensions now under way in laboratory and semicommercial operations are perfected. Polymerization units are now operating or under construction at 24 domestic and foreign refineries. One installation has been completed to operate with cracked gases obtained from a natural gasoline plant and recently another company announced plans to operate what was termed a combination gas liquefaction and polymerization plant. The commercial application of polymerization at this time is largely confined to recovery of the unsaturated hydrocarbons available in refinery gases by catalytic or thermal processing. The latter includes limited cracking of saturated hydrocarbons.

HYDROGENATION

While less is heard of hydrogenation in connection with refinery operations than was the case a few years ago it holds a stronger position than it did then as a probable phase of future refinery operations. In a sense competitive with polymerization, the acceptance of the latter has tended to emphasize the fact that in future refinery operations there are several methods of accomplishing the same thing. Hydrogenation operations have been practically continuous for several years in two units located at the Bayway, N. J., refinery of the Standard Oil Co. of New Jersey and the Baton Rouge, La., refinery of the Standard Oil Co. of Louisiana, a Standard Oil Co. (New Jersey) unit. These operations have varied from time to time, being used in the manufacture of lubricating oils, gasoline, kerosene and superior grades of diesel fuels. The last involves the introduction of hydrogen extracted from natural gas with low-gravity asphaltic base gas oil in the production of paraffinic oils from which a substantial yield of gasoline is also obtained.

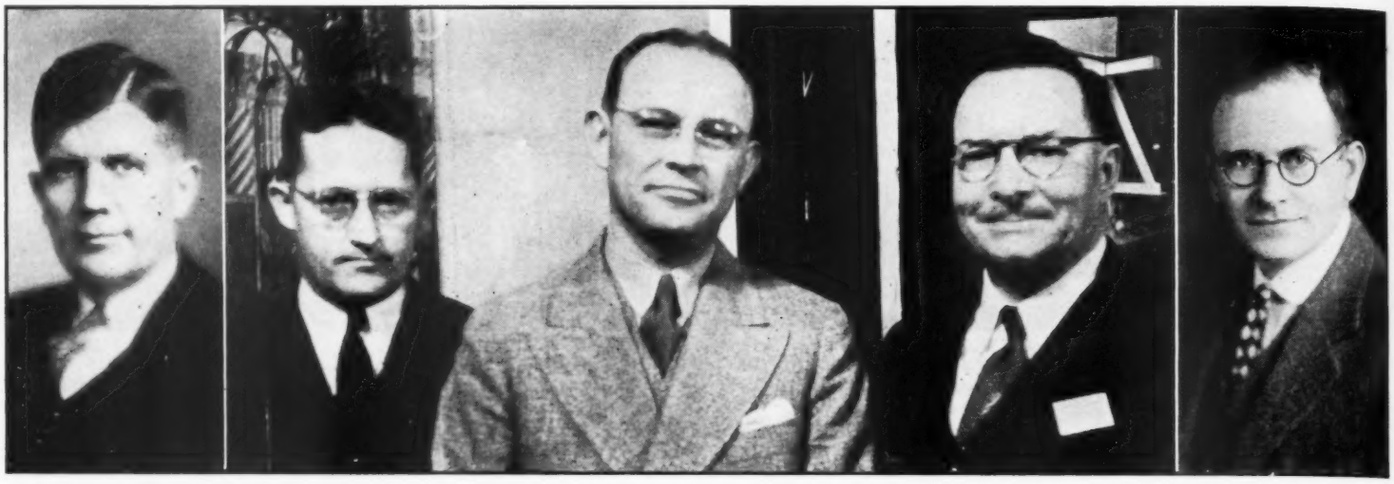


Top of contact chambers forming important part of hydrogenation unit in Baton Rouge, La., refinery of Standard Oil Co. of Louisiana

Petroleum Geologists and Geo

Discuss Exploratory

By L. P. STOCKMAN
and T. P. SANDERS



EXECUTIVE BOARD, A.A.P.G.—*R. D. Reed, retiring president; Ira Cram, secretary-treasurer; H. B. Fuqua, president; C. L. Moody, vice president; W. A. Ver Wiebe, editor*

LOS ANGELES, Calif.—Los Angeles was host last week to members and guests of the American Association of Petroleum Geologists and associated societies attending the twenty-second annual meeting, the first time California has been host to the association since the meeting in San Francisco in March, 1928. A total of 52 papers was presented at the general meeting in addition to 22 technical papers at the sessions of the paleontology and mineralogy division and 16 at the seventh annual meeting of the Society of Exploration Geophysicists, formerly the Society of Petroleum Geophysicists.

Frank A. Morgan, vice president, Rio Grande Oil Co. and general chairman of the convention committee, called the meeting to order and A. I. Well, president of the California Oil and Gas Association, delivered an address of welcome to which A. I. Levorsen, past president of the association responded.

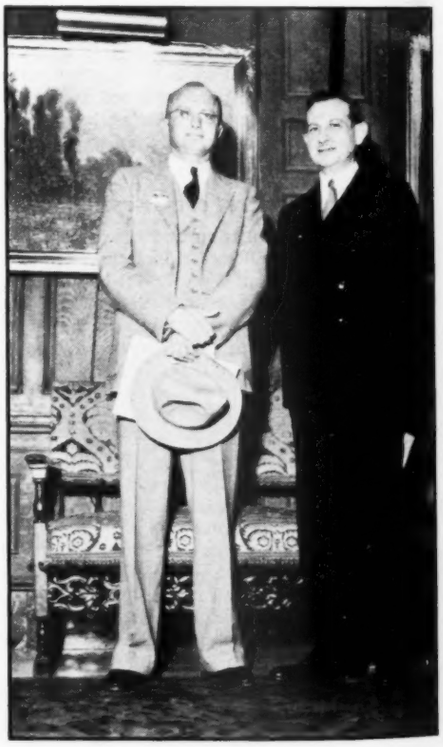
Retiring president Ralph D. Reed, chief geologist for Texas Co., Los Angeles, chose for his subject a discussion of "Southern California as a Structural Type." This paper was largely a review of the work of Doctor Reed recently published on "Geology of California." After discussing many important geophysical features common to California Doctor Reed suggested the importance of studying the geology of the East Indian Archipelago published by the Netherland Geodetic Commission for some additional evidence to aid in solving many of the problems confronting the paleontologist in his study of California.

Dr. L. W. Blau, retiring president of Paleontology and Mineralogy Division, A.A.P.G., and F. W. Rohshauser, new vice president

REVIEW OF WORK

On Thursday afternoon a review of work was presented. The Gulf Coast districts of Texas and Louisiana, according to O. L. Brace, furnished 13 new productive areas during the past year, a considerably poorer record than in 1935, both as to the number and character of new fields. None of the Texas discoveries can yet be said to be of major proportions, although initial developments on several give promise of new reserves of considerable magnitude. Most of the discoveries lie in the deep coastal zone, but two new fields along the Jackson trend and three in the intermediate zone trend tend to reinstate these inactive updip areas as profitable for further exploration. Flank development on old domes was an important activity. The discovery of commercially productive horizons at depths greater than 10,000 feet tends to the belief there are vast potentialities at depths below those to which present day exploration has been carried.

West Texas and southeastern New Mexico were covered by Berte R. Haigh and Dr. Hal P. Bybee of San Angelo, Tex., who said nine pools classified as new were discovered in West Texas during 1936 and practically all fields in Andrews, Ector, Ward and Winkler counties were extended. In southeastern New Mexico three new areas were opened and five producing fields were extended. Wildcat exploration in both areas during 1936



L. J. Neuman, consulting geologist, Houston, Tex., and Dr. Joseph L. Adler, president, Pathfinder Prospecting Co., New York

physicists Problems

was lower than during 1935 but development work in proved areas was higher.

Harry H. Nowlan of San Antonio, Tex., covered Southwest Texas and stated a number of important discoveries were made in the San Antonio district, probably the most important being the Flour Bluff field south of Corpus Christi. Some 20 odd fields were discovered and about as many new productive sands in old and new fields. The importance of geophysics in the Gulf Coast area was especially stressed. One of the most important discoveries was the completion of a small well in the Upper Cretaceous at Pearsall in Frio County as this has apparently extended production in this formation for about 125 miles and has an influence on an area of probably 10,000 square miles. Among other important discoveries are pools in Aransas, Calhoun, Duval and Jim Wells counties. North and West-Central Texas and the Panhandle were discussed by A. W. Weeks, and Northwest Texas by Wallace Ralston.

U.S.S.R. WILDCATTING

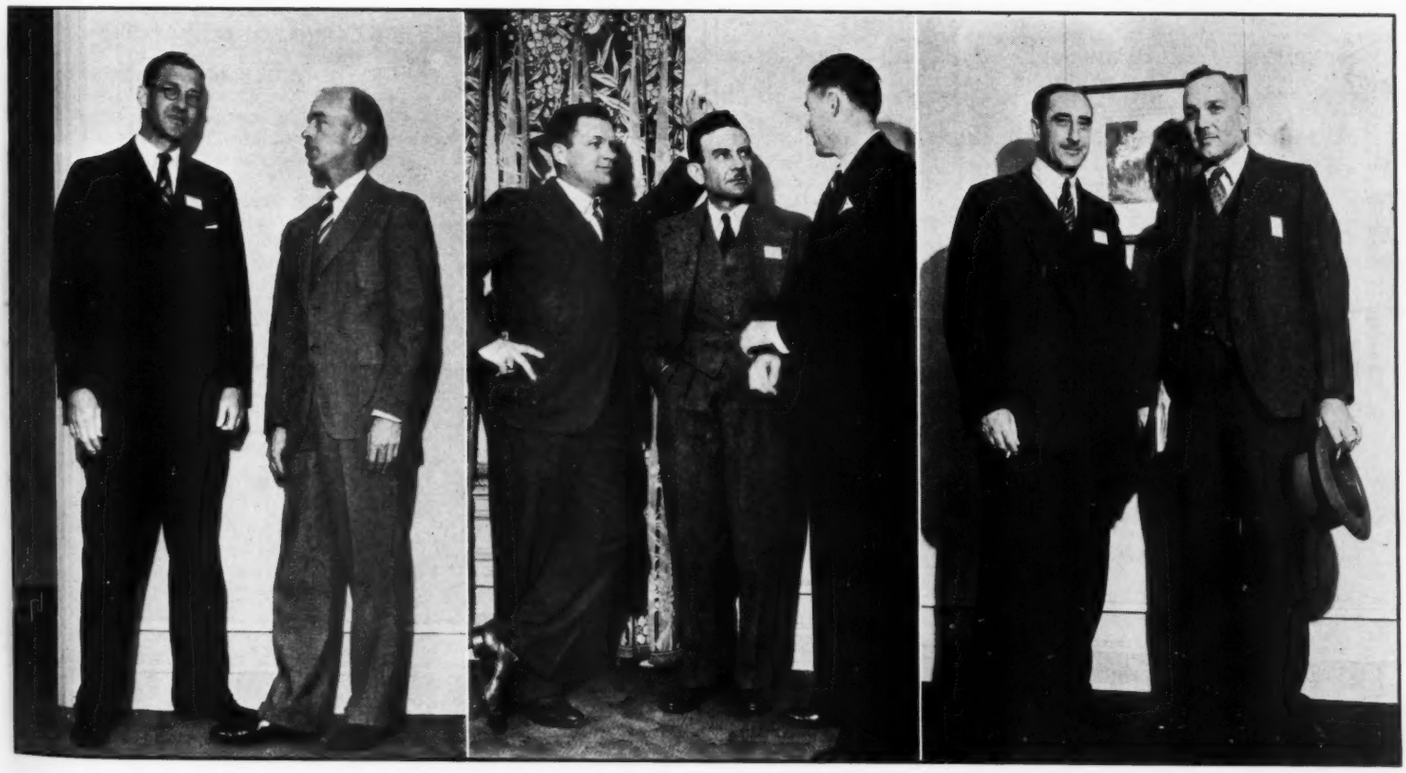
Basil B. Zavoico stated preparations for wildcatting in the U.S.S.R. during 1934 and 1935 was especially thorough and resulted in several major discoveries during 1936. He expressed opinion the industry in Russia has progressed sufficiently to adopt American methods of wildcatting with steam and diesel power which would involve a minimum of capital investment and greatly accelerate exploration. The Caucasus supplied all of the major discoveries during 1936, due probably to a clearer understanding of stratigraphy and structural conditions of the areas, accessibility of the region and forced exploration of major structural features by as many as 10 or 15 tests. The outstanding discoveries were made on the shores of the Caspian Sea in Dagestan province near Makhach-Kala about midway between Gronzy and Baku.

W. E. Wrather of Dallas, Tex., and F. M. Van Tyle, of Golden, Colo., in informal conversation

Frank A. Morgan, vice president, Rio Grande Oil Co., Los Angeles, Calif., and Joseph S. Irwin, Calgary, Canada, at attention

Izberbash, a large faulted anticline with major closures on both sides of the fault, was the most important discovery made during 1936 as wells were completed with initials ranging above 3,000 bbls. of 40 gravity per day from the chokrak sands of Miocene age at depths ranging from 5,400 feet to 5,900 feet. The Achi-Su field near Izberbash was discovered in 1936 and although its initial yields are small, from 70 to 200 bbls. daily, the depth is very shallow, around 2,400 feet, and the structure is of large areal extent. On the Apsheron Peninsula in Puta district, a notable discovery was made at Shangar. Kergez and Kizil-Tepe fields, discovered prior to 1936, were actively developed and extended and in the older fields of Baku district greater penetration into Pliocene oil measures of deeper oil fields uncovered additional reserves of major magnitude. South of Apsheron Peninsula a major field was discovered at Pirsagat in 1936 and a second producer was completed late in the year yielding 2,500 bbls. daily from 4,500 feet. In

(Continued on Page 50)



BETWEEN SESSIONS—*C. W. Sanders, regional geologist, Shell Petroleum Corp., The Hague, Holland, with Sherwood Buckstaff, geologist from Shell Petroleum Corp., Tulsa; Elfred Beck, Tulsa; Glen Ruby, Los Angeles; A. L. Selig, Houston; Angus McLeod, chief geologist, Shell Oil Co., California, and Dr. George S. Hume, director, Petroleum Division of Canadian Geological Survey, classmates from University of Toronto*

SPARKS FROM THE NEWS

New crude production peak last week was at the rate of 1,261,500,000 barrels yearly, or 60,000,000 barrels more than the top estimated requirements for 1937.

The keynote of the A.A.P.G. Los Angeles meeting was that new oil reserves can be found, but costs will be higher.

Some companies which went into the automobile accessory business at their stations in a big way have additional evidence that it requires something more than volume to assure profits.

Texas Railroad Commission recognizes danger signals and plans substantial reduction in state allowable for April.

War preparations in Europe mean more fuel oil and diesel oil for navies and high-octane gasoline for aviation. The other side of picture is that these preparations interfere with steady peacetime gains in demand for petroleum products.

Automobile manufacturers who believe hypoid gears reduce noise should attend meeting of refiners discussing methods of compounding satisfactory lubricants for this innovation.

If suggestion made by A.A.P.G. speaker that producers keep accurate records so they will know what it costs to find and produce oil is carried out, some retirements among the operators are in the offing.

Expressions of sympathy for the parents—most of them employed in East Texas field—in the New London disaster come from all parts of the oil country. Aid extended by oil companies in the field made outside help unnecessary.

Four counties in the Permian Basin reported well completions with initial outputs ranging from 3,000 to 5,500 barrels daily.

Oklahoma reports what may prove to be the most important development of year in that state with a half-mile extension of Langston pool in Logan County.

A sit-down strike in an automobile plant among other things postpones the operation of a car which otherwise would be consuming more than 50 gallons of gasoline and several quarts of motor oil monthly.

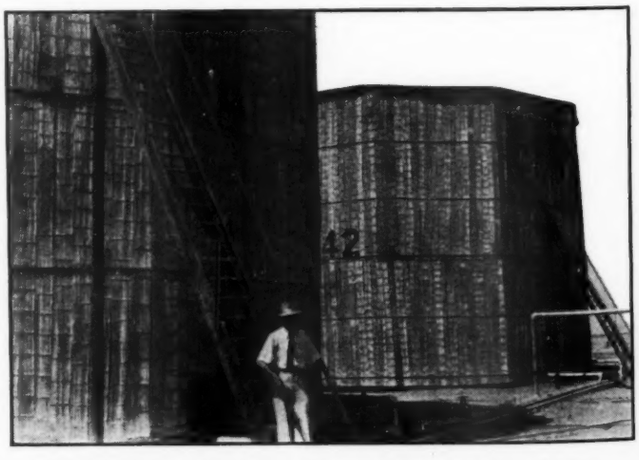
New deep sand in Rosecrans field gives California an important new oil reserve.

Refiners, still selling their principal product, gasoline, for less than a cent per pound, are constantly finding new ways to increase yields and improve quality.

Arrival of spring is reflected in preparations for increased drilling activity in Rocky Mountain states and Canada.

Texas last week produced more crude oil than it did in all of 1910.

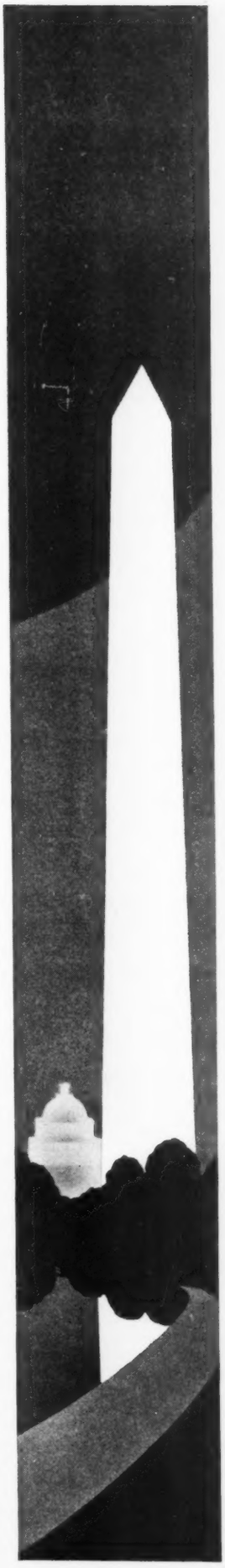
SUNSHADE FOR STORAGE



Straw covering for high test gasoline tanks tried in Talara field, Peru

Federal Regulation of Gas Is Likely

By HENRY D. RALPH



WASHINGTON, D. C.—Legislation to provide federal regulation of the interstate distribution of natural gas is likely to be enacted by this congress as hearings on the Lea bill were scheduled by the house committee on interstate and foreign commerce and a group of municipal officials announced intention of working for a drastic federal law. This group is the Cities Alliance which embraces about 100 mid-western cities and which has prepared a bill introduced by Senator Prentiss Brown of Michigan and Representative Robert Crosser of Ohio. (S. 1919 and H.R. 5711.)

It is probable the committee will be favorable to the Lea bill, H.R. 4008, reported by the committee last May, since its author, Representative Clarence F. Lea of California, is now chairman of the committee. Representative Crosser, however, is the ranking democratic member of the committee and is in a position to throw weight behind his measure.

The committee authorized Chairman Lea to appoint a special subcommittee on the subject. The Interstate Commerce Commission recently recommended regulation of natural gas lines and indicated it will not object to having jurisdiction vested in the Federal Power Commission instead of in itself as natural gas transportation is often allied with power distribution.

OBJECTIVE OF BILL

In introducing his bill, Senator Brown said:

"On behalf of the Cities Alliance I have introduced a bill which has for its ultimate objective a nation-wide reduction of gas rates and a saving of many millions of dollars to the American public each year. If enacted the bill will establish regulation over interstate natural gas pipe lines by the Federal Power Commission, will promote conservation of natural gas through interstate compacts, and will aid in removing monopolistic restraints from the natural gas industry.

"The bill follows closely a measure approved at a conference of midwest municipal officials at Cleveland, Ohio, on February 10. It is based upon findings by the Federal Trade Commission, and results from two years' investigation by midwestern cities. More than 75 cities of Michigan and Ohio alone are cooperating.

"I am introducing the bill at the request of John W. Smith, former mayor and now president of Detroit's common council, national chairman of the Cities Alliance, and also chairman of the natural gas committee of the U. S. Conference of Mayors through appointment by the conference president, Mayor F. H. LaGuardia of New York.

"I favor this legislation because it is designed to protect rate payers and utility investors, to conserve a precious national resource, and because it also fosters sound competitive enterprise within the industry. It prohibits banking control of interstate pipe lines, opposes acquisition of excessive gas acreage to shut out potential competition, and permits independent pipe lines to compete with entrenched holding companies in supplying additional natural gas to present markets. While the bill represents the municipal gas consumers' viewpoint, natural gas producers and the industry generally are invited to present their views.

INCLUDES COMPACT

"This bill not only sets up the machinery for a compact, but prohibits interstate transportation of natural gas that may be produced in violation of such a compact. The bill does not usurp the powers of state regulatory commissions. It merely extends effective supervision into the twilight zone where state authority vanishes—across a state line. It provides for regulation of the price at which natural gas transported interstate, may be wholesaled at a 'city gate.' It does not seek to regulate the retail rates. Neither does it seek to regulate prices at which natural gas may be sold to industry."

Luke J. Scheer of Detroit, executive secretary of the Cities Alliance, in a statement to The Oil and Gas Journal, said:

"The Cities Alliance was organized by municipal officials of eight midwestern states at a conference on natural gas problems at Columbus, Ohio, in January, 1935. Its purpose was then, and it continues to be the elimination of monopolistic practices in the natural gas industry, as a principal cause of exorbitant gas rates.

"Municipal officials contend the only effective method of checking those abuses is by a rigid enforcement of the federal antitrust laws and new legislation to bring interstate gas pipe lines under federal supervision. The Cities Alliance believes such new legislation should point the way to conservation of natural gas resources, particularly in the Southwest.

"Senate bill 1919, introduced by Senator Brown, represents the municipalities' views. It differs from the bill introduced by Congressman Lea in these respects:

"1. The Cities Alliance bill prohibits banking control over interstate gas pipe lines.

"2. It gives the Federal Power Commission authority to challenge such elements entering into wholesale prices of natural gas transported interstate as the cost of carrying more gas acreage than is necessary to protect a gas company's markets.

"3. It does not require that an independent pipe line company must obtain a federal certificate in order to compete with established natural gas systems in supplying additional natural gas to present markets."

The Cities Alliance was organized at the suggestion of the then president of the U. S. Conference of Mayors, Daniel W. Hoan of Milwaukee.

WATER POLLUTION

Enactment of moderate legislation to reduce pollution of streams by oil, sewage and other industrial wastes appears probable as a result of hearings held by the house committee on rivers and harbors. The committee has before it two bills, H.R. 2711, introduced by Representative Fred M. Vinson of Kentucky, similar to the Barkley bill in the senate, and H.R. 3419, introduced by Representative Joseph L. Pfeifer of New York, and similar to the Lonergan bill in the senate. The Vinson bill was favored by all witnesses except Representative Pfeifer and Senator Lonergan, and it was evident the committee will not approve the drastic Pfeifer bill.

The Lonergan and Pfeifer bills give the government large regulatory power, and are mandatory measures calling for immediate action and levy of heavy fines for offenders.

The Barkley-Vinson bill calls for cooperation between state and federal governments, and between two or more state governments. It proposes grants in aid to state and local governments to reduce pollution, and a study of the situation by the U. S. Public Health Service before action is taken.

Russell B. Brown, representing the Independent Petroleum Association, the only witness from the oil industry, advocated the Vinson bill, and opposed the Pfeifer measure:

"In the oil industry we have the double problem of caring for the manufacturing or refinery wastes, on which great progress has been made and on which the industry is now spending vast sums of money with much promise of continued improvement, and a proper disposal of the natural brines produced with oil. This latter has proved a most perplexing problem for which little solution has been found, although it has had the combined attention not only of the industry but of the state and federal governments. Until this problem is solved we would on the passage of a 'force bill' (Pfeifer type) be confronted with serious crippling of our production program or have to continue to produce oil and at the same time violate our laws. Such a bill would throw consternation into the operators of more than 330,000 oil wells, many of whom would not be able to install waste disposal plants even if they or any one knew what to install. The Vinson bill would promote cooperative effort looking to the solution of the pollution problem."

Pennsylvania May Make Gasoline Public Utility

By J. P. O'DONNELL

HARRISBURG, Pa.—An administration-sponsored bill for regulation of the petroleum industry in Pennsylvania is now under consideration by the commonwealth's Democratic legislature.

Introduced by Paul C. Lewis and John J. Finnerty, Philadelphia Democrats, the bill would set up a commission of five men, three to be appointed by the governor and one each by the president of the senate and the speaker of the house. The sum of $5,000 would be appropriated for expenses but the members serve without compensation.

According to the bill, the duty of the commission would be:

". . . To make a careful, thorough and impartial investigation into the operation of the oil industry in this commonwealth, with special reference to the adequate, efficient and economical supplying of lubricating oils and gasoline to the people . . . at reasonable prices not inconsistent with the fair costs of production and distribution: to ascertain and to report to the governor . . . its findings as to whether the oil industry is so affected with public interest as to require statutory regulation; and its recommendations, if any, as to legislation needful to correct any abuses and evils connected with the whole operation of the oil industry in this commonwealth which are prejudicial to the interests of its citizens."

The resolution would empower the commission to issue subpoenas commanding persons to appear before it and to answer questions touching matters properly inquired into and to produce books, papers, records and documents, such subpoenas to have the effect of subpoenas issued out of the courts.

In the preamble the bill's sponsors hold that "The prices of oils and gasoline are at present subject to wide and unpredictable fluctuations, dependent neither upon the normal relation of demand to supply nor the reasonable expenses of production and distribution, but upon the intense, and frequently uneconomical, competition in the oil industry, in the course of which prices are capriciously raised or lowered by the refiners of oils and gasoline in furtherance of their several ruthless ambitions to dominate their industry.

"The public has a vital interest in the economical operation of the oil industry to the end that lubricating oils and gasoline may be supplied efficiently to the people at prices insuring no more than a fair profit above the reasonable cost of production and distribution."

The administration's attitude on the oil industry was revealed in December when John B. Kelly, state secretary of revenue, said he favored making gasoline a public utility in Pennsylvania to halt what he termed "arbitrary" price increases.

Kelly's statement was made December 13, the day after the retail price of gasoline had been raised 1½ cents in Philadelphia. "This incident and others like it demonstrate how very much gasoline is a public utility," he said. "If a fair rate board is established in Pennsylvania I will strongly favor putting regulation of gasoline prices under its control so that arbitrary increases in the cost of motor fuel cannot be forced upon the motorist in this manner." He said he would support a law authorizing such a board to fix the price of gasoline in much the same manner as the prices of electricity and milk are fixed.

Before the 1½-cent increase went into the effect in Philadelphia, the retail price of gasoline there, exclusive of taxes, was 11 cents or 1¾ cents below the average for 1932 when the depression was at its lowest level.

The matter was brought to the fore again when Gov. George H. Earle, in his opening address to the legislature, urged appointment of a committee "to study the question of monopolistic practices in the gasoline and oil industry, particularly price wars and price fixing," and asked the legislature to consider the feasibility of including gasoline and oil under public utility regulation.

The proposal returned to the legislative calendar early this month with Governor Earle's proposal to "rip out" the 24-year-old Public Service Commission and replace it with a fair rate board, the commission which Secretary Kelly favored for regulating the price of gasoline.

Latest action was the introduction on March 15 of the Lewis-Finnerty joint resolution to set up the investigating commission.

OBITUARIES

CHARLES M. HIGGINS, 80, a vice president and director of Standard Oil Co. of New York and one of the pioneers in the oil industry, died March 20 at the Lenox Hill Hospital, New York, after a brief illness.

ALBERT W. PARKS, president of the Oil Springs Oil & Gas Co., died at Oil Springs, Ontario, aged 82. A native of Illinois, he was associated with oil operations in Ontario since 1879.

RUSH J. WALL, prior to 1934 in the oil business in Cleveland, Ohio, died at Chatham, Ontario, recently.

RALPH A. WOODS, 60, retired oil man, Tulsa, died March 22.

ALEXANDER G. McKAY, 98, widely known years ago as a driller in Pennsylvania, Australia and western Canada, died at Ingersoll, Ontario, recently.

Crude Oil Stocks

Stocks of domestic and foreign crude at the close of the week ending March 6 totaled 289,611,000 bbls., according to the Bureau of Mines, an increase of 1,490,000 bbls., comprising increases of 1,416,000 and 74,000 bbls. in stocks of domestic and foreign crude, respectively. Daily average crude runs to stills were about 2,930,000 bbls., or 155,000 bbls. below the week ending February 27. Imports of crude showed little change, the daily average being 31,000 bbls., compared with an average of 32,000 bbls. for the previous week.

STOCKS OF CRUDE PETROLEUM

Grade of crude oil—	March 6	Change from February 27
Pennsylvania Grade	4,049,000	— 6,000
Other Appalachian	877,000	— 5,000
Lima-N.E. Indiana-Michigan	882,000	+ 31,000
Illinois-S.W. Indiana	9,637,000	+ 67,000
N. Louisiana and Arkansas	10,222,000	— 33,000
W. Texas and S.E. New Mexico	28,462,000	+ 65,000
East Texas	21,758,000	— 56,000
Other Mid-Continent	115,305,000	+1,240,000
Gulf Coast	24,488,000	+ 104,000
Rocky Mountain	25,869,000	— 30,000
California	29,204,000	— 81,000
Foreign	1,408,000	+ 74,000
Total reported weekly	272,161,000	+1,390,000
Est. of unreported stocks	17,450,000	+ 100,000
Total stocks	289,611,000	+1,490,000

Motor Fuel Consumption by States

	12 months ending with Dec., 1936 (gallons)	Dec., 1935 (gallons)	1936 Gallons increase over 1935	% of increase or decrease
Alabama	203,384,000	172,446,000	30,938,000	17.94
Arizona	95,648,000	80,994,000	14,654,000	18 09
Arkansas	154,727,000	143,379,000	11,348,000	7 91
California	1,625,794,000	1,482,211,000	143,583,000	9 68
Colorado	205,913,000	182,367,000	23,546,000	12.91
Connecticut	294,455,000	269,871,000	24,584,000	9.10
Delaware	50,772,000	45,398,000	5,374,000	11 83
District of Columbia	126,834,000	116,274,000	10,560,000	9.08
Florida	310,472,000	298,696,000	11,776,000	3.97
Georgia	296,314,000	268,530,000	27,784,000	10.34
Idaho	87,370,000	72,635,000	14,735,000	20 28
Illinois	1,191,916,000	1,069,243,000	122,673,000	11 47
Indiana	561,132,000	496,835,000	64,297,000	12 94
Iowa	460,086,000	421,152,000	38,934,000	9 24
Kansas	450,330,000	408,707,000	41,623,000	10.18
Kentucky	228,335,000	201,325,000	27,010,000	13.41
Louisiana	216,430,000	189,502,000	26,928,000	14.20
Maine	134,521,000	121,109,000	13,412,000	11.07
Maryland	244,761,000	217,665,000	27,096,000	12.44
Massachusetts	656,318,000	610,797,000	45,521,000	7 45
Michigan	995,629,000	885,244,000	110,385,000	12.46
Minnesota	480,873,000	442,769,000	38,104,000	8 60
Mississippi	163,795,000	145,120,000	18,675,000	12 86
Missouri	561,796,000	511,835,000	49,961,000	9 76
Montana	108,963,000	96,326,000	12,637,000	13.11
Nebraska	230,951,000	231,602,000	*651,000	* 002
Nevada	34,227,000	30,164,000	4,063,000	13.46
New Hampshire	80,898,000	73,904,000	6,994,000	9.46
New Jersey	745,482,000	695,772,000	49,710,000	7.13
New Mexico	75,849,000	62,340,000	13,509,000	21 66
New York	1,721,831,000	1,610,544,000	111,287,000	6 90
North Carolina	348,164,000	309,800,000	38,364,000	12 38
North Dakota	111,373,000	120,077,000	*8,704,000	*7 24
Ohio	1,165,834,000	1,044,529,000	121,305,000	11.61
Oklahoma	366,591,000	330,507,000	36,084,000	10.91
Oregon	216,582,000	186,629,000	29,953,000	16.04
Pennsylvania	1,283,280,000	1,177,719,000	105,561,000	8.96
Rhode Island	118,385,000	109,408,000	8,977,000	8.61
South Carolina	164,177,000	144,729,000	19,448,000	13 43
South Dakota	113,381,000	118,967,000	*5,586,000	*4.69
Tennessee	263,583,000	224,355,000	39,228,000	17 48
Texas	1,096,238,000	959,549,000	136,689,000	14 24
Utah	81,848,000	71,065,000	10,783,000	15.17
Vermont	59,936,000	52,604,000	7,332,000	13.93
Virginia	316,685,000	282,413,000	34,272,000	12.13
Washington	319,285,000	278,672,000	40,613,000	14.57
West Virginia	181,891,000	159,090,000	22,801,000	14.33
Wisconsin	504,259,000	442,444,000	61,815,000	13.97
Wyoming	58,634,000	49,498,000	9,136,000	18.45
Total	19,565,922,000	17,716,811,000	1,849,111,000	10.43
Daily average	53,459,000	48,539,000	4,920,000	10.13

*Decrease.

Trade Commission Action Not to Change Marketing Policy

By H. STANLEY NORMAN

NEW YORK. — Oil companies will not change their marketing technic as a result of the Federal Trade Commission's complaint filed last week against Texas Co. This was the consensus of company executives seen after the commission entered its complaint charging Texas Co. with violation of the exclusive dealing section of the Clayton act through its contracts and leases with service stations in distribution of accessories.

The complaint deals with an alleged understanding that stations cannot sell or use parts and accessories sold by certain competitors. Specifically, the commission charges that Texas Co. contracted with six manufacturers of automobile parts and accessories to buy and resell their products, in some instances on consignment, and in some cases agreed to urge its dealers in certain areas to handle these particular brands. In some cases, the complaint said, the dealers bought the accessories directly through Texas Co., but where the dealers bought direct from the manufacturers Texas Co. also received a commission.

Accessories have become an important sales factor

In describing the operations of the company, the commission stated it has more than 40,000 retail outlets, of which less than 200 are directly owned and operated by it. The others are operated under leases or lease and agency agreements, or by independent dealers who contract to purchase petroleum products from Texas Co. Dealers, the commission states, have substantial investments in their stations and one of their valuable assets is the contract to deal in petroleum products of Texas Co., but "the power of the respondent to terminate such relations, without assignment of grounds, tends to make said lessees, licensees, and contracting dealers subservient to the expressions of the wishes of representatives of the respondent as to the conduct of their business."

NOT ILLEGAL

The complaint does not charge that the contracts were in themselves illegal, but asserts that Texas Co. forced these accessories upon its dealers and secured understandings that the dealers would not handle competitive products. This was done, according to the complaint, through threats of cancellation of dealer contracts, exercise of "powerful constraint" through oral and written communications, and through meetings of dealers addressed by representatives of the company.

The specific charge against the company under the Clayton act is that it makes and renews service station leases and sales contracts on the condition that the dealers will not handle merchandise of competitors of the automobile accessories manufacturers from which Texas Co. purchases. The charge under the Federal Trade Commission Act is that through these practices the company monopolizes retail outlets for accessories, thereby closing these outlets to its competitors, and that this results in lessening competition in the sale and distribution of automobile parts and accessories in all parts of the United States, in obstructing the normal flow of trade, in injuring competitors, and in injury to the public, and constitutes an unfair method of competition in interstate commerce.

ABIDING BY LAW

While the company has not authorized any rebuttal statement, it is common knowledge all the allegations will be categorically denied. The charges, which must be answered early in April, are generally believed based on assertions of a few disgruntled dealers. Although details of marketing differ, oil companies feel they are abiding by strict interpretations of the Robinson-Patman Act, the Clayton Act and the Federal Trade Commission Act.

The Texas Co. is expected to contend that no coercion has been employed restricting its dealers to handle any one line of accessories. In conducting the business of its company operated stations, it probably will contend its contracts with the various companies in the complaint are within limits of the law, arguing that while certain products were "recommended' no authorized effort has been made to restrict its dealers to those items and each individual was privileged to exercise his judgment in determining what tires, tubes, batteries and other accessories he should stock.

The importance of the accessory market is a matter of record. For example, there is a potential market for $17,000,000 worth of new headlight globes each year; a market for $13,000,000 worth of new batteries to replace exhausted units; and a market for approximately 520,000 new tires through service stations alone. Including tire chains, windshield wipers, dust cloths, flashlights, oil filters, antifreeze solutions, fan belts, ignition system fuses and numerous lesser accessories, this phase of service stations business probably runs around $100,000,000 annually.

Under the Iowa plan of operating service stations, the accessory business has not only increased but has become one of the major concerns of lessees and dealers. Sales of accessories offer dual opportunity of increasing earning capacity of well-located, aggressive dealers and of producing a fair margin of profit for the less fortunately situated dealer. This additional business makes it possible for isolated stations to pay a reasonable rental, or installment on their property which would not be possible if dependent on gasoline and oil sales alone. The increased earning capacity of individual outlets possible through vigorous promotion of accessory sales has appealed to station lessees or purchasers, who have pushed this type of business to the limit, working on the premise that motorists appreciate the opportunity of getting a full line of service along with their gasoline and crankcase requirements.

Texas Allowable Is Reduced Nearly 50,000 Barrels

AUSTIN, Tex. — Allowable production for Texas effective April 1 has been set by the Railroad Commission at 1,348,964 bbls., a decrease of 49,550 bbls. from the March 1 allowable, but is 51,064 bbls. greater than the market demand estimate of the Bureau of Mines, which is 1,297,900 bbls. daily for April.

Current allowable production as of March 18 is 1,430,969 bbls., or 32,455 bbls. greater than the March 1 allowable. The April 1 allowable will represent a decrease of 82,005 bbls. from that figure.

Market demand for Texas oil during April, as based on nominations of purchasing companies, is 1,636,019 bbls. daily, or 287,055 bbls. greater than the April 1 allowable.

Allowable production by districts for Texas April 1 compared with March 1 follows:

District—	Allowable April 1	Allowable March 1
Southwest Texas	209,430	227,186
Gulf Coast	193,853	207,023
East Central Texas*	70,202	74,479
Rodessa	38,454	39,400
East Texas field	455,000	453,000
West Central Texas	62,891	64,428
West Texas	178,947	188,483
North Texas	67,537	68,625
Panhandle	72,150	75,610
Total	1,348,964	1,398,514

*Except Rodessa and East Texas field.

Governor of Kansas Appoints New Member to Commission

By L. G. E. BIGNELL

The Kansas State Corporation Commission was reorganized March 20 and Judge E. R. Sloan, of Topeka, Kans., was appointed to succeed Jesse W. Greenleaf and to serve with Homer Hoch and Ernest E. Blincoe. Mr. Blincoe is the new chairman succeeding Mr. Hoch. The commission is appointed by the governor for four-year terms. Mr. Blincoe's term expires March 20, 1939, and Mr. Hoch will continue to serve until March 20, 1940.

In many respects Kansas is unique as an oil state because there has been developed a large number of small oil pools in the western part of the state and it is probable many more will be found. Adding this new production presents ever changing conditions to be solved by the operators and the corporation commission jointly. The pipe lines are constantly extending lines to connect new wells and the whole situation is one of rapid development and change.

Kansas State Corporation Commission. Homer Hoch, retiring chairman; Ernest E. Blincoe, chairman, and Judge E. R. Sloan, new member

Much of this new oil is found in the Siliceous lime and under present rules it is necessary to take potential tests as soon as the wells are completed that allowables may be established, and these tests are repeated in 60 days as checks. Operators have been placed in position of having to compete with one another for high potentials to secure equitable allowables but for some time it has been realized this attempt to force new wells to produce to full capacity for a period of from 24 to 48 hours was poor production practice in these lime formations and if water did not come into the well during the first test it was almost certain to break through when the second test is being made 60 days after the discovery.

This whole setup has resulted from orders issued by the commission at suggestion of the operators. However, it is now admitted the conditions that existed when the operators asked for the present rules have been decidedly changed. Realizing this, operators are having their production men and engineers meet in Wichita and other cities in Kansas to discuss the general problems of specific pools with hope of arriving at some mutually satisfactory plan for taking potentials and fixing allowables.

If the majority of the operators in any field can agree upon some method of taking potentials the corporation commission has indicated orders will be issued to conform with the desired practice. This will result in equitable allowables and eliminate the tendency to pull water into the wells. It is also hoped methods of operation can be agreed upon which will scale downward the capital investment required to complete the wells. Then if the allowables per well are adjusted the returns upon the invested capital will be more rapid and this will tend to induce additional investments in Kansas properties.

There are also factors of conservation. Any oil state is interested in the largest ultimate recovery of gas and oil within its boundaries. The total oil recovered is the basis upon which gross production tax is to be estimated and any regulation which tends to reduce ultimate recovery will cause loss of revenue to the state, as well as to the property owners. If potential taking causes high investment charges, tends to pull water into the wells and increases the cost of recovering oil the profitable life of the wells is materially reduced and much recoverable oil is left in the reservoir.

There are physical conditions in some of the western Kansas fields which have forced oil companies to increase their investments. Wells below 4,000 feet deep cost more than the direct ratio of depth would indicate. It has been found the Mississippi lime is a very hard, tough rock to drill and contractors have been obliged to increase their cost of drilling from around $3.50 per foot for wells less than 4,000 feet deep to about $5.50 per foot for wells where it is anticipated Mississippi lime will be encountered. In addition to this added cost the material needed to complete the wells costs more and if such wells are required to be equipped with heavy duty pumping machinery to be in position to secure high potentials the capital investment is out of proportion to what it costs to secure producing wells in other areas in Kansas or other states.

These general conditions are all well known to the corporation commission of Kansas and the operators. There is a desire on the part of both parties to correct existing evils and the oil companies are holding engineering meetings to try to arrive at plans mutually satisfactory to all interested in some of the Kansas fields, and when these plans have been perfected and submitted to the commission it is believed they will be approved and proper orders issued. As these plans are worked out for individual fields it is believed general plans which can be applied to all fields will be evolved.

There are possibilities of developing Ordovician production in the southwestern portion of Kansas. One well now completed in Clark County produces from the Viola lime and has been given a potential of 2,383 bbls. but is allowed to produce only 98 bbls. daily because of its general classification. This will result in a very slow return upon the capital invested and the owner will be inclined to defer drilling additional wells, and it will also tend to keep other investors from making tests in this general area to find other deep seated oil fields.

Oil Executives Take Part in Oil Burner Meeting

PHILADELPHIA, Pa.—Adoption of scientific distribution methods in an effort to match scientific mass production and consumption was urged upon dealers attending the National Oil Burner and Air Conditioning Exposition at Philadelphia last week, by Dr. Herbert W. Hess, professor of marketing at the Wharton School of Finance and Commerce of the University of Pennsylvania.

"Scientific mass production methods," he said, "enabled the manufacturer to produce goods beyond the distributor's ability to sell in an orderly, scientific and profitable manner. 'High pressure' selling methods to break down resistance to sale of products should not be criticized, rather, the methods should be accepted as indispensable and instrumental in increasing sales."

Danger of permitting tax-hungry legislatures to get a foothold on the fuel oil business was sounded by Baird H. Markman, director of the American Petroleum Industries Committee. Although only two states, Mississippi and Washington, at present are taxing fuel oil as such, Mr. Markham said bills designed to impose similar taxes were introduced in 15 states in 1935, in four last year and in at least seven so far in 1937. Representative Patrick Boland of Pennsylvania had reintroduced in congress a bill calling for a federal fuel oil tax of a cent a gallon.

Mr. Markham said there was no need for "punitive and penalizing" taxes in the oil burner industry. He said experience with the taxation of gasoline has demonstrated that once legislatures have selected a product to be taxed, they do not hesitate to increase the tax burden until it becomes prohibitive.

"Current proposals to tax fuel oil have suggested a rate of only a cent a gallon," said Mr. Markham. "There is no assurance, however, that fuel oil tax rates would not rise rapidly, just as have gasoline tax rates. Even a 1-cent tax on fuel oil is a heavy sales tax—nearly 17 per cent."

Charles N. Lockwood, Rock Island, Ill., was elected president of the Institute. The following were elected vice presidents: F. H. Dewey, Gar-Wood Industries, Inc., Detroit; J. J. Donovan, General Electric Co.; E. P. Bailey, National Airoil Burner Co., Philadelphia; M. H. Powers, Timken Silent Automatic Co., Detroit; and Earl Marr, Westinghouse Electric Supply Co. A. E. Knapp, Nash-Kelvinator Corp., Detroit and J. A. Lattner, Century Engineering Corp., Cedar Rapids, Iowa, were elected directors.

For the first time in the burner industry's history, an organized delegation of oil executives visited the exposition and participated in the business program. In the oil executive group were, J. Edgar Pew and W. C. Pew, Sun Oil Co.; Fred A. Eldean, American Petroleum Institute; V. L. Uhl and W. C. Yeager, Atlantic Refining Co.; E. W. Miles, Standard Oil Co. of Indiana; B. L. Boye, Socony-Vacuum Oil Co., Inc.; E. E. Overton and Dr. R. T. Goodwin, Shell Union Oil Corp.; Wiley Butler, Standard Oil Co. of New Jersey; Frank E. Spencer, Spencer Petroleum Co., and W. R. Quattrocchi, Warner-Quinlan Co.

The 1937 annual meeting and convention of the Mid-Continent Oil and Gas Association of Texas will be held in Dallas on October 29 and 30.

Lubrication of Hypoid Gears Is Major Problem for Refiners

By J. P. O'DONNELL

OIL CITY, Pa.—That the automobile industry has imposed a serious problem on the oil industry by the widespread use of hypoid gears in 1937 automobiles was made plain during a discussion of hypoid gears and their lubricants before the Oil City-Titusville group of the Department of Standards and Tests, National Petroleum Association, here attended by 75 members of the Oil City-Titusville and affiliated groups.

G. C. Mather, of Frank Harris Floyd, Inc., Detroit, opened with a synopsis of a paper, "Lubrication Requirements of 1937 Rear Axles and Transmissions," which he had presented before the Northwest Petroleum Association. He pointed out the trend toward higher unit pressures under which gear sets must operate and stated these demands have become so great normal mineral oils are no longer capable of protecting the gears. The requirements of the hypoid axle can be met only with a specially designed and carefully made ultra-powerful, lead, active-sulfur lubricant, complying in every respect with the car makers' recommendations.

NOT READY FOR CHANGES

The oil industry was not prepared to provide this lubricant on short notice was the contention of Joseph A. Moller, Pure Oil Co., Chicago, who asked if the automobile industry is not running the oil industry now, that it is saying, in effect, "We put out the cars, you lubricate them."

"The oil industry was not and is not ready for those changes," he continued, "and if we do not put up the warning sign, we will have this scramble all over again when the 1938 cars come out." Mr. Moller further contended the car manufacturers build automobiles within the limitations of their materials but do not extend this same consideration to oil when the proper lubrication should be one of their gravest concerns.

"If the automobile industry is trying to force the oil industry too fast, we'll stumble," Mr. Moller said. He questioned if the 1937 car will be operating with the original gears at the end of three or four years.

"Does the oil industry assume that the automobile industry shall say, 'Do,' and we do?" he asked. "Do we owe our allegiance to the automobile industry or to our customers?"

C. W. Georgi, Enterprise Oil Co., Buffalo, agreed with Mr. Mather's statement that the trend in automobile manufacturer is toward greater stress on the gear and said the demand for extreme pressure lubricants of greater stability will grow. He predicted "straight mineral oils will be out of the picture some day."

Mr. Georgi said it was the job of the automotive engineer to reduce costs and if he effects a saving in steel by use of the smaller hypoid gear he has done a good job.

Both Mr. Georgi and Mr. Moller discussed tests of hypoid lubricants made over the past six years and both agreed the problem had not been entirely solved before the advent of the hypoid gear on the widespread scale in the 1937 automobiles.

Mr. Georgi mentioned that the average hypoid gear action takes place at temperatures below 200° and the maximum normal temperature was between 100° to 120° above atmospheric temperature in suggesting tests be made within this range. It was brought out temperatures at one point in the gear action approximated the melting point of the gear surface. It is this excessive heat that progressively neutralizes the effectiveness of the lubricant, Mr. Mather said, in urging changes at 6,000 miles. He said changes at 6,000 miles were urged so the motorist would make the change in 10,000 miles.

How some refiners are making lubricants to meet the specifications of the manufacturers of the 10 most popular cars which include 94 per cent of all automobiles, was told by F. J. Phillipbar, Kendall Refining Co., Bradford.

Variations in results of tests, the fact that some lubricants will pass certain sets of specifications and not others and the inadequacy of present testing machines were described as the greatest difficulties of the lubrication engineers. Mr. Mather described the most common testing machine as more of an antiweld test than a lubricant test, stating such tests "positively are not lubrication tests but proofs of the degree of the chemical activity of the endpoint agent employed."

Russel R. Buckham, of James B. Berry Sons' Co., Inc., Oil City, chairman of the group, conducted the meeting. Remarks were made by A. W. Scott, of the Wolverine-Empire Co., Oil City, trustee of the department; J. E. Moorhead, executive secretary, Pennsylvania Grade Crude Oil Association, Oil City, and David B. McCalmont, attorney, National Petroleum Association, Washington, D. C.

REPRESENTATIVE ATTENDANCE

Those attending were: E. E. Bown, F. J. Phillipbar, Philip P. Healy, Harold Krantz and Ralph Hufford, Kendall Refining Co., Bradford; C. R. Wells, Jr., and A. D. Hill, Sinclair Refining Co., Wellsville, N. Y.; Joseph A. Moller, Pure Oil Co., Chicago; K. W. Nichols, Floridin Co., Warren, Pa.; Russell R. Buckham, C. S. Pearson, Ralph Schwab and Duane Williams, James B. Berry Sons' Co., Inc., Oil City.

I. L. Kline, Eugene Hanna, A. Henderson, C. H. Thomas, A. Young, William Mong and James Brown, Continental Refining Co., Oil City; F. E. Williams, F. J. Planker and Thomas Parks, Quaker State Oil Refining Corp. (Emlenton, Pa., plant); A. W. Scott, W. E. Hughes, W. B. Smith, A. W. Cole, C. R. Scott,

(Continued on Page 50)

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Petroleum

Discovery Rates in Oil Finding

By WALLACE E. PRATT
Vice President, Humble Oil & Refining Co., Houston, Tex.

A.A.P.G.—Before annual meeting, American Association of Petroleum Geologists, Los Angeles, March, 1937

On several occasions during the past 15 years committees in the petroleum industry have deliberated on the question of the adequacy of the reserves of petroleum remaining unmined at the time, as against our probable future needs. Such committees have commonly realized that a factor more important for their purposes than the volume of the known or proven reserves is the volume of oil that may be added to the known reserves through future discoveries. Yet, because of the paucity of evidence bearing on discovery probabilities, reports on studies of this character have omitted any quantitative estimate for future discoveries. Quite generally investigators have voiced the secure belief that additional discoveries would be forthcoming in requisite number, but they have uniformly failed to support their belief with convincing proof. I have examined the record of past discoveries in the hope that in it some trend or other characteristic might be identified which could be brought to bear directly on the problem of gauging future discoveries. This inquiry has afforded no secure criterion for the estimation of the volume of future discoveries, but it has thrown a revealing light on the character and the accomplishment of this discovery effort up to the present.

More than 30,000,000,000 bbls. of oil had been discovered in the United States up to the end of the year 1935. This figure represents the amount already produced plus that still present in known, proven natural reservoirs, underground. In the latter category, our underground reserves, there are estimated to be some 13,000,000,000 bbls. Roughly, nine-tenths of this total volume was found in the last 35 years of the period. The American experience over this period is analyzed by five-year periods in Table 1, which was compiled by John V. Boyce, and originally presented in slightly different form in a paper I read in May, 1935, before the Chamber of Commerce of the United States at Washington, D. C.

DISCOVERIES BY PERIODS

Table 1 fixes the discovery of the reserves in each important field as of the year during which the first commercially successful oil well was completed. The whole reserve at Kettleman Hills, for example, is credited to the year 1928, East Texas to the year 1930, and Conroe to the year 1931. In a small number of poorly defined producing areas, such as Archer County, Texas, the extensions are credited for each year in which they develop.

Perhaps the most arresting feature of this record of the progress of discovery is the fact 40 per cent of all our oil was discovered within a period of only five years, 1926-30. More than one-half the total was found within 10 years, 1921-30. A generally accelerated rate of discovery is revealed for the United States at large, and for each of the three most important producing states, throughout the last three decades of the period under review. In each case the rate of discovery reaches a conspicuous peak in the period 1926-1930 and falls abruptly thereafter. Through the years oil-finding appears to have become more fruitful of results, measured in barrels of reserves discovered until it attained a maximum some six or eight years ago; thereafter its accomplishment failed suddenly and in marked degree.

It may be questioned whether the volume of reserves discovered constitutes a really significant measure of the success of oil-finding. The task of discovering a small oil field is at least as difficult as the task of discovering a large one, and the discovery of a single large field may distort intolerably the record of barrels found. The discovery of the East Texas field, for example, is equivalent to the discovery of some 30 major oil fields, if only the volume of reserves in barrels is considered. Perhaps a better index of success in discovery effort would be, therefore, the number of new oil fields found rather than the number of barrels of reserves found.

Table 2 shows the number of major oil fields found since 1900 (through 1935) in the United States as a whole and in each of the important producing states, California, Oklahoma and Texas. For the purposes of this compilation a major oil field is defined as one whose ultimate reserves are estimated at more than 20,000,000 bbls. That is to say, any field large enough to supply the present national requirements for one week, or more, is classed as a major oil field. Nearly 200 such fields are included in the table. Their average size is more than 100,000,000 bbls. and collectively they account for nearly 80 per cent of all the oil discovered in the United States during the period.

The curve of discovery for oil fields, as indicated in Table 2 takes on the same character as the curve of discovery for oil reserves shown in Table 1, namely, a gradual rise through successive five-year periods to a conspicuous peak in the half decade, 1926-1930, followed by a sharp drop at the end. The experience in the three most important producing states duplicates that of the nation at large in this respect, leaving little doubt that, whatever may be the explanation, oil-finding in the United States really passed through a maximum of accomplishment in the late 1920's.

Before inquiring into possible explanations of the character of the discovery record, it may be pertinent to ask how the industry has gone about its job of finding oil in the past. What particular method of exploration led to the discovery in each case? Mr. Perry Olcott has assisted me in a study of this problem, the results of which are shown in Table 3.

The several categories of discovery methods in Table 3 require brief explanation. Column (1) is made up of the fields discovered by random drilling, that is, pure wildcatting with no logical basis to justify it. Column (2) contains all discoveries that have resulted from wells drilled on such obvious indications as oil and gas seepages at the surface or in shallow wells, and on less direct evidences such as general trends, mounds over salt domes, or other points of uplift on constructional surfaces, paraffin dirt, and mineralized springs. No discovery of this character has been credited to geology in Table 3, yet it is difficult to eliminate all geologic inference from the considerations that must have influenced the sponsors of these exploratory enterprises. In other words, it would be easy and perhaps logical to credit geology with some of these discoveries. Column (3), geological discoveries, consists of all discoveries which resulted from geologic exploration, either surface and subsurface studies, including core drilling. Column (4) is the list of geophysical discoveries,

TABLE 1—AVERAGE ANNUAL DISCOVERIES BY SUCCESSIVE FIVE-YEAR PERIODS IN THE UNITED STATES AS A WHOLE AND IN THE IMPORTANT PRODUCING STATES OF CALIFORNIA, OKLAHOMA AND TEXAS

Period—	California Million of bbls.	California Per cent	Oklahoma Million of bbls.	Oklahoma Per cent	Texas Million of bbls.	Texas Per cent	U. S. Million of bbls.	U. S. Per cent
1901-1905	35	0.6	135	3.4	55	1.0	345	6.3
1906-1910	110	2.0	65	1.1	2	...	300	5.4
1911-1915	45	0.8	180	3.3	105	1.9	435	7.9
1916-1920	185	3.4	140	2.5	110	2.0	660	12.0
1921-1925	305	5.5	90	1.6	210	3.8	875	15.9
1926-1930	435	7.9	290	5.3	1225	22.3	2165	39.4
1931-1935	25	0.5	100	1.8	395	7.2	725	13.2
		20.8		18.2		38.3		100.0

TABLE 2—MAJOR FIELDS DISCOVERED IN THE UNITED STATES AT LARGE AND IN THE IMPORTANT PRODUCING STATES OF CALIFORNIA, OKLAHOMA AND TEXAS, BY FIVE-YEAR PERIODS

Period—	California No.	California Pct.	Oklahoma No.	Oklahoma Pct.	Texas No.	Texas Pct.	U. S. No.	U. S. Pct.
1901-1905	1	0.5	3	1.5	5	2.5	10	5.0
1906-1910	2	1.0	1	0.5	0	...	5	2.5
1911-1915	1	0.5	5	2.5	7	3.6	18	9.2
1916-1920	4	2.0	5	2.5	5	2.5	23	11.7
1921-1925	8	4.1	6	3.1	15	7.7	40	20.4
1926-1930	11	5.7	12	6.2	24	12.2	59	30.4
1931-1935	4	2.0	6	3.1	15	7.7	41	20.8
Total	31	15.8	38	19.4	71	36.2	196	100.0

TABLE 3—MAJOR OIL FIELDS DISCOVERED IN THE UNITED STATES OVER SUCCESSIVE FIVE-YEAR PERIODS, CLASSIFIED AS TO METHODS OF DISCOVERY

Period—	1 No.	1 Pct.	2 No.	2 Pct.	3 No.	3 Pct.	4 No.	4 Pct.	5 No.	5 Pct.	6 No.	6 Pct.
1901-1905	2	20	7	70	1	10	....	0.0	....	0.0	10	100
1906-1910	2	40	2	40	1	20	....	0.0	....	0.0	5	100
1911-1915	3	16.7	8	44.5	7	38 9	....	0.0	....	0.0	18	100
1916-1920	1	4.3	4	17.4	17	73.9	....	0.0	1	4.3	23	100
1921-1925	13	32.5	10	25.0	17	42.5	....	0.0	....	0.0	40	100
1926-1930	5	8.5	5.5	9.3	37	62.7	5.5	9.3	6	10.2	59	100
1931-1935	5	12.2	....	0	12.5	30.5	22.5	55.0	1	2.4	41	100
Total	31	15.8	36.5	18.6	92.5	47.2	28.0	14.3	8	4.1	196	100

(1) Discoveries resulting from purely random drilling.
(2) Discoveries resulting from obvious evidences.
(3) Discoveries resulting from geological observations.
(4) Discoveries resulting from geophysical investigations.
(5) Discoveries resulting from drilling deeper in territory already producing in shallow sands.
(6) Total discoveries since 1900 by five-year periods.

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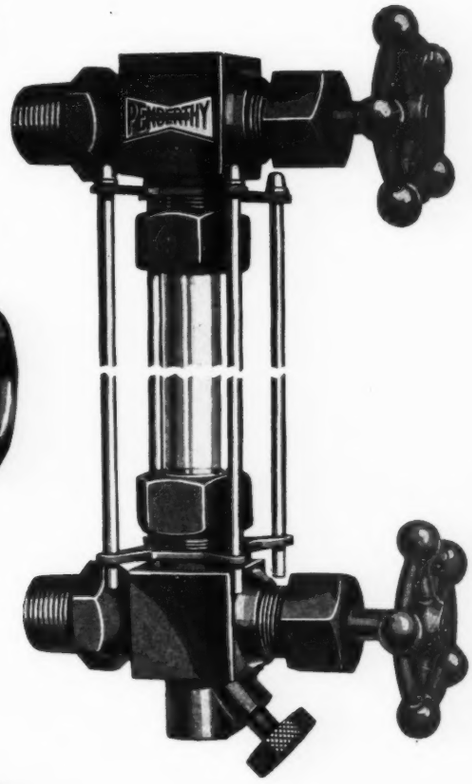

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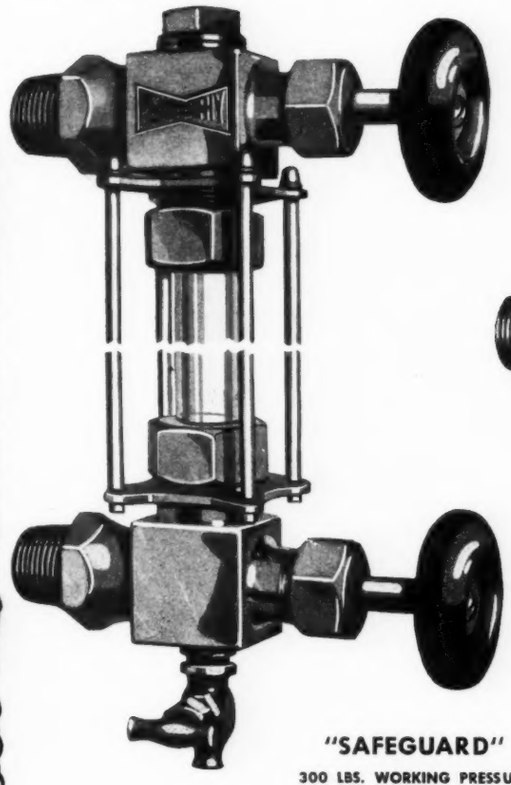

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some of which, of course, were guided in part by geological studies. Column (5) shows discoveries resulting from deeper drilling in old fields. Such exploration, again, is often guided by geological studies, at least in part.

TABLE 3

Table 3 may not be absolutely accurate in its classification by methods of discovery. Another inquirer might arrive at a slightly different result, but it is believed the general trends would remain.

In comment on Table 3, it may be observed that strictly geological studies are responsible for the discovery of nearly 50 per cent of the major oil fields found in the United States during the past 35 years, and that pure "wildcatting" has yielded only 17 per cent of the total harvest of major oil fields. Only 19 per cent of our major fields have manifested themselves at the surface with sufficient clarity to be identifiable except by an expert. If the effort we have put forth had depended solely on luck and obvious evidences, therefore, we would have found only 36 per cent of the major oil fields we have found over this 35-year period.

For the last 10 years the situation in this respect is even more striking. Our discoveries for the last 10 years number 100 major oil fields; more than the number discovered in the preceding 25 years. But only 4.6 per cent of these resulted from obvious evidences, and only 10 per cent were due to the random-drilling type of wildcatting. Geological studies maintain their overall record of discovering 50 per cent of our major oil fields, and geophysical exploration, closely akin to geologic exploration, is responsible for 28 per cent of the major oil fields found during the last decade. If the results of geology and geophysics are combined, they include 78 per cent of our finding accomplishment during the last 10 years. Obvious surface evidences and random drilling together have revealed to us only 16 major oil fields (16 per cent of the total) within the past 10 years; less than one-half their previous contribution.

Perhaps more significant than the relative accomplishment of each method of exploration is their varying effectiveness with the passage of time throughout the period under review. Random drilling was important early, accounting for 30 per cent of the discoveries in the first decade of the period under review. It attained its greatest effectiveness in the one-half decade, 1921-1925, with a record of 13 major oil fields in five years, 2.6 oil fields per year, equivalent to one-third of the total number found. Drilling on obvious evidences was important in the early part of the period, also, yielding us 70 per cent of our discoveries in the first one-half decade, 1901-1905. Thereafter it continued to furnish a large proportion of our major oil fields each decade until the last when, as stated already, its contribution fell to 4.6 per cent. Geological exploration, on the other hand, made little contribution to the accomplishment of the first decade and did not reach its maximum effectiveness until the period 1926-1930, during which it was responsible for the discovery of 37 major oil fields, an average of more than 7 per year. Over the last five years its accomplishment has been sharply reduced to 12.5 major fields for the period, a rate lower than it had shown since the 1911-1915 period. Finally, geophysics only got started within the last decade, having no discovery to its credit previously. Nevertheless, for the last half-decade it has established a record of 22.5 discoveries of major oil fields, 55 per cent of the total accomplishment.

Possibly the tendencies suggested by Table 3 are not valid. Perhaps we shall again make a large proportion of our discoveries of major oil fields by random drilling or by drilling on or near obvious evidences of the presence of oil. Perhaps we shall again find as many as seven major oil fields per year over a five-year period by geological exploration. But these possibilities seem unlikely. Most of the obvious oil fields appear to have been found and the number of wildcat wells drilled at random has fallen off in recent years. Our geological discoveries are definitely fewer in number and constitute a smaller proportion of the total discoveries over the last five years. Only geophysics continues to maintain its accomplishment. All of the older methods combined have yielded us only 19 major oil fields in the last five years, a number smaller than the achievement of these methods for any similar period since 1915.

A rough gauge of efficiency in oil finding is the number of dry holes drilled per major discovery. If our only method of exploration was random drilling of wildcat wells, this index would be more significant. Our recently improved methods of exploration in advance of drilling have enabled us to reduce the number of dry holes drilled per discovery. Over the nation at large we have drilled about 1,000 dry holes for each major oil field we have found up to the end of 1935. But in recent years this ratio has fallen markedly, until during the last five years it has averaged only 500 dry holes per major discovery.

In discussions of the stability of the producing industry, the suggestion that we could well do with a smaller volume of oil in proven reserve is often advanced. Those who feel secure in our ability always to find more oil when we need it believe the present reserves to be excessive and burdensome. Considered merely as an inventory our reserves are undoubtedly heavy. No one likes to carry in stock all the raw material he expects to use over the next 10 or 15 years. But as true reserve, to be drawn on only as needed, our underground storage constitutes no burden, and is not too large.

ANOTHER ASPECT

Another aspect of our reserves, apart from their adequacy as a supply for a certain number of years, has recently come to be realized. If oil is to be produced efficiently, that is, if recovery is to be reasonably complete and unit cost low, it must be produced at a rate slower than we have been accustomed to in the past. The optimum rate of production for a given pool depends, among other factors, upon the size of the reserve. The rate of production necessary to meet our national needs has risen to a point where our present reserves are barely large enough to permit efficient production at the required rate. The fact is coming to be recognized despite our current ability to produce, temporarily, in excess of market demand. Some of our production is simply maintained at a wastefully high rate. This consideration makes it desirable to maintain our reserves at something like their present volume, even though we could do with smaller reserves so far as other purposes are concerned. We need about our present reserve to permit efficient production at our present rate of consumption.

Frank Rieber, geophysicist, and Roy Barnes, chief geologist for Continental Oil Co., California, at A.A.P.G. meeting in Los Angeles

An economist would be tempted to explain the abrupt drop in discovery subsequent to 1930 as a result of the economic and industrial depression which began at the end of 1929. As a matter of fact, many of those with whom I have discussed the record in recent years have seized immediately upon this explanation once they have accepted the record itself. Without doubt the depression slowed up exploratory work, and so tended to retard discovery. But 1935 was not a depression year so far as exploration was concerned; it could hardly have been more active. Yet discoveries for 1935 are not large compared to the average discoveries from 1926 to 1930, inclusive. The year 1936, again, although it is not included in the preceding tables, appears now to have yielded smaller total discoveries even than 1935, despite feverish activity in exploration. In the light of this evidence, the depression, alone, begins to appear inadequate as an explanation for the slump in finding.

Moreover, when one analyzes the methods by which our discoveries have been made, and learns that our methods of finding oil have been gradually changing, and that our use of the old established methods seemingly reached the point of diminishing returns about the time our discovery rate began to fail, the coincidence at once makes obvious another possible factor in our retarded discovery rate. Our persistence in searching for deeper oil in the regions already proven for production has forced us to rely more and more exclusively on geophysics as a guide to finding, as our older methods failed us. Geophysics alone has not as yet been equal to the task of finding as much oil as our older methods combined used to find. And so discovery rates have declined.

The conclusion would seem to follow that if we are to maintain our established record in rate of discovery, or even to find oil at a rate equal to the current rate of consumption, we must further improve our finding technique in the near future. Our recent efforts to this end have been directed toward the perfection of geophysical methods for determining structure at greater depth. But there is obviously a limit to the depth to which wells can be drilled. There is also a limit to the depth at which oil may be encountered even where structural conditions are favorable. This limit varies from one district to another, but many of our more deeply-buried structures have recently been proven to contain gas instead of oil. As we go still deeper this tendency is more manifest. It is clear that we cannot always add to our reserves of oil merely by drilling to greater depths.

STRATIGRAPHIC POOLS

A. I. Levorsen, our retiring president a year ago, outlined a line of research more promising than deeper drilling as a means of improving our finding technique. He recommended geologic studies at once under broader and more intensive than our old "structure hunting" methods for the purpose of discovering what he designates "stratigraphic" pools; that is, pools of the East Texas type, where the reservoir control results from stratigraphic or "shore line" conditions rather than from simple local deformation of the enclosing strata. Intensive studies in stratigraphy, sedimentary petrography, and paleontology, with the continued aid of geophysics, will become the working tools of this new technique. Such pools are often large, and, therefore, are worth finding, but it should be recognized that in the search for them the exploration must be carried out largely by the actual drilling of wells. Only the general locality can be indicated by the geologist or geophysicist, and within it the drill, through one test hole after another, must carry the exploration to completion.

If an active, deliberate search for stratigraphic pools is undertaken by the producing industry two reversals in recently established trends may be anticipated; namely (1) the recently manifested decline in the number of dry holes per major discovery will be arrested or reversed; (2) the demand for the services of competent geologists, which has slackened recently in favor of geophysi-

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cal exploration, will be quickened. Drilling in search of stratigraphic pools will amount, practically, to "core drilling" large areas to extreme depths. "Core drill" holes are almost invariably dry holes, and to be most useful they must be supervised so closely by geologists as almost literally to be drilled by geologists.

In summary, it may be said: (1) Our discovery rate in oil-finding was rather uniformly accelerated as the industry expanded through the period subsequent to the year 1900 until, over the years 1926-1930, it reached a peak more than double our current rate of consumption. Thereafter it declined sharply until it averaged, over the next five years, only about 70 per cent of our current rate of consumption. (2) This is true whether discovery rate be measured in terms of barrels of reserves found, or in terms of major oil fields found. (3) Geological exploration has been dominantly our most effective finding method in the past. It has been less effective over the past 10 years than it was previously, and has definitely yielded leadership to geophysics over the last five years. (4) Whether the failure of the discovery rate to maintain its earlier pace is to be explained as an effect of the recent industrial depression, as is generally assumed, or by the inadequacy of our finding technique to cope with increasing difficulty of oil-finding, may be debatable, but the evidence supports the latter as a major contributing factor. (5) We now drill fewer dry holes per major discovery than we did formerly, but this trend may be arrested or reversed in future exploration. (6) Our proven reserves, now about 13,000,000,000 bbls., are probably adequate or even excessive, viewed solely as a reserve supply, but they should be maintained at their present level to permit of production in an efficient manner and at the same time at the rate necessary to meet consumption. (7) Our finding technique definitely needs to be strengthened. Merely finding structural traps at greater depths and drilling deeper wells to tap them, as we have been doing in recent years, promises too little to permit us to rely upon it alone. (8) The most likely means of improving our oil-finding accomplishment is embodied in Mr. Levorsen's suggestion, made a year ago, that we initiate an intensive search for "stratigraphic traps." (9) This enterprise, if adopted, may be expected to cause an increase in the ratio of dry holes to discoveries, and to quicken the demand for expert geological supervision. But it should accomplish its purpose; namely, the discovery of important additional reserves of petroleum.

A.A.P.G.

(Continued from Page 39)

the Northern Caucasus near the Black and Azoff seas, several small fields were discovered in Maikop and Kuban districts, outstanding being Asphalt Mountain and Kutaiski in Maikop and Adagum and Keslerovo in Kuban.

ELECTION OF OFFICERS

The annual business meeting was held Friday morning. H. B. Fuqua, Gulf Production Co., Fort Worth, Tex., was elected president of the American Association of Petroleum Geologists succeeding Ralph D. Reed, chief geologist of Texas Co. in California, who will be a member of the executive committee, ex officio. C. L. Moody, Ohio Oil Co., Shreveport, La., was elected vice president and Ira Cram, Pure Oil Co., Tulsa, secretary-treasurer. Dr. W. A. Van Wiebe, University of Kansas, Wichita, Kans., was elected editor. None of the offices was contested.

PALEONTOLOGISTS AND GEOPHYSICISTS

While the technical sessions of the A.A.P.G. were in progress, the Paleontology and Mineralogy Division and the Society of Exploration Geophysicists were holding meetings.

The geophysicists elected J. C. Karcher of Dallas, Tex., as president, succeeding Dr. L. W. Blau of Houston, Tex., and F. M. Kannenstine of Rosaire and Kannenstine of Houston, Tex., vice president. Mr. Kannenstine has been editor of this group for several years. Miss Elisabeth Stiles, Independent Exploration Co. of Houston, Tex., was elected secretary-treasurer and E. B. Slotnick, Humble Oil & Refining Co., Houston, Tex., was elected editor. Wallace E. Pratt, vice president of Humble Oil & Refining Co., and L. P. Garrett, vice president of Gulf Production Co., were elected to honorary membership of the Society of Exploration Geophysicists.

SOCIETY OF EXPLORATION GEOPHYSICISTS

In the technical sessions of the Society of Exploration Geophysicists the papers most enthusiastically received were those which discussed one method of prospecting in a somewhat complete form. Papers of this type were Dr. A. B. Bryan's "Discussion of the Gravity Meter," and F. G. Boucher's "Development of the Pendulum for Prospecting." These papers, both outlining procedures used in new branches of geophysics, were apparently of more general interest than the papers describing or suggesting further improvements in the already complicated field of the seismograph.

F. L. Aurin, geologist, Ponca City, Okla., and Richard B. Rutledge, Skelly Oil Co., Tulsa, at Los Angeles

The introductory paper before the geophysicists sessions, with Dr. L. W. Blau presiding, was presented by Dr. B. Gutenberg. It stated that geophysics, being a young science, is still engaged in reclaiming fields of investigation rightly belonging to it from older sciences. In most cases the branches of geophysics were developed from the older science, and since the branches differ so widely from one another, Doctor Gutenberg believes no one person could master all parts of the geophysical field, or become proficient in all of the branches of specialized knowledge into which the subject may be divided.

Doctor Bryan began his discussion of the gravity meter by stating its purpose, which is to measure the magnitude of gravitational forces at many points in an area as an indication of the character of the underlying rocks. He illustrated several types of the instrument with slides. The result of gravity meter work is a gravity map, theoretically the same as a torsion balance map. Discussion brought out that gravity surveys were best suited for the search for salt domes; otherwise they should be used in conjunction with reflection shooting with the seismograph.

Dr. Morton Mott-Smith's paper, "Adverse Effects Associated With Variably Compounded Seismic Records," was of interest to experienced Seismograph men, since it discussed the advantages and disadvantages of the method of variably compounding seismic reflection records, to secure the so-called "controlled directional sensitivity," over the more common method of fixed compounding or multiple recording.

Of interest to both geologists and geophysicists was the material presented on Wednesday at a joint session of both groups. Frank Rieber showed a motion picture presentation of the reflected wave patterns from various geologic structures. Dr. L. W. Blau presented his paper, "Interpretation of Geophysical Data," which proved to be of unusual interest, because the speaker proposed a new form of organization for the handling of geophysical data, whereby the geophysicists and the geologists would work independently in mapping an area, and the final report would be made from both maps. This, it was contended, would prevent geologists from interpreting geophysical data to correspond to their previously conceived ideas on the structure. Discussion tended to disagree with this proposal, and it was pointed out when the geophysicists started work in California they could not tell what reflected the seismic waves without cooperation from the geologists. Mr. Rieber stated that in California, at least, the geophysicists owed the geologists a debt of gratitude.

Marion H. Gilmore's account of "Earthquake Investigations" as carried on by the Coast and Geodetic Survey showed the importance of earthquakes to science. All earthquakes originate in outer parts of the earth, but send waves through the earth which can be recorded on delicate seismographs on the opposite side. This makes it possible to obtain information of the interior not otherwise obtainable.

On the seismograph important improvements in technique were described, notably in Henry Salvatori's "Mapping of Faults by the Reflection Method." The thought of this paper was continued by Curtis M. Johnson in his paper, "The Use of the Sonograph in Mapping Faults." G. H. Westby's article on "Some Phases of Seismic Reflection Work in Antarctica," was presented by title.

PALEONTOLOGY AND MINERALOGY DIVISION

A symposium on California Cretaceous and Tertiary stratigraphy and paleontology was followed by papers of more general interest. The Paleontology and Mineralogy Division of A.A.P.G. elected G. Stanley Wissler, chief paleontologist, Union Oil Co., Los Angeles, as president to succeed Merle C. Israelsky, who presided at the opening session. The other officers elected were F. W. Rolshausen, Humble Oil & Refining Co., Houston, Tex., vice president; Henry V. Howe, department of geology, Louisiana University, secretary-treasurer; and Raymond C. Moore, University of Kansas, was reelected as editor.

HYPOID GEARS

(Continued from Page 45)

D. W. Faloon, John Baltzell and C. A. Kramer, Wolverine-Empire Refining Co., Oil City.

H. W. Wagner, C. D. Thayer, Glenn E. Morley and V. Ver Milyea, United Refining Co., Warren, Pa.; J. E. Moorhead, S. A. Hartwell, Jr., and Wes W. Dunlap, Pennsylvania Grade Crude Oil Association, Oil City; Dr. G. O. Ebrey, H. A. Speigelman, J. M. Hinman, G. A. Breene, H. M. Jones, Raymond Dardes, M. E. Kofford and W. J. Daily, Pennzoil Co., Oil City; G. C. Atwell, E. V. Dorrance and Paul I. Tinkler, Sloan & Zook Co., Warren, Pa.

G. W. Engle, W. Merle Cross, F. H. O'Neil, R. L. Sailer, H. W. Winkler, D. A. Smith, H. W. Hubbell, J. R. Mills and M. A. Stillwagon, Valvoline Oil Co., Franklin, Pa.; David B. McCalmont, National Petroleum Association, Washington, D. C.; John W. Kight, Penola, Inc., Pittsburgh, Pa.; William B. Dashem, Hyvis Oils, Inc., Warren, Pa.; W. J. Hannigan and Edward Collins, Cities Service Oil Co., Titusville, Pa.

W. Ryan Storey, Ultra-Penn Refining Co., Warren, Pa.; Robert W. Young, Quaker State Oil Refining Corp., Oil City; C. W. Georgi, Enterprise Oil Co., Buffalo, N. Y.; Russell Gulnac and L. W. McClimans, Franklin Creek Refining Co., Franklin; J. A. Passauer and Jack Wolfe, Tidioute, Pa.; G. C. Mather, Frank Harris Floyd, Inc., Detroit; C. W. McConnell, Conewango Refining Co., Warren, Pa., and Henry Suhr, producer, Oil City.

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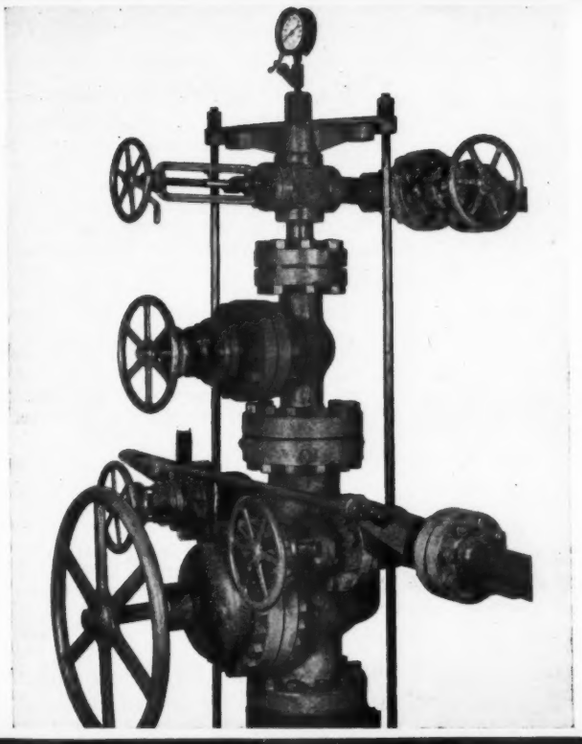

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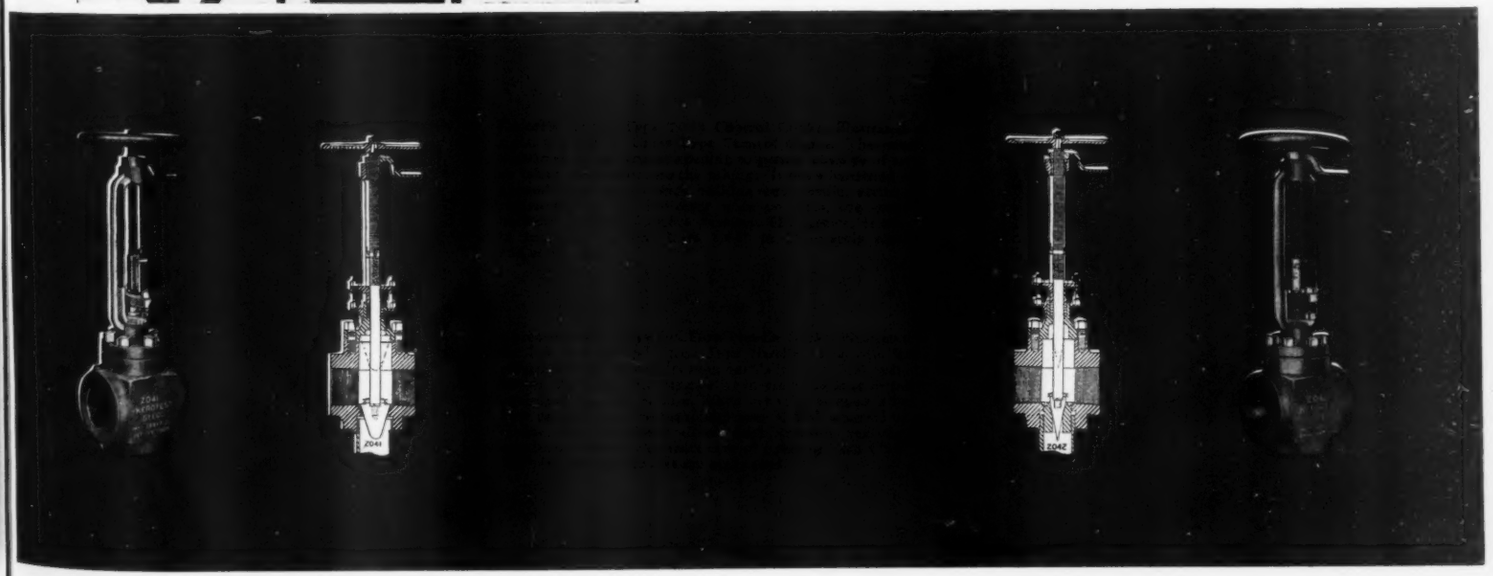


Natural Gas News

California Gas Merger

LOS ANGELES, Calif. — Seeking to give consumers better service and cheaper rates, Los Angeles Gas & Electric Corp. and Southern California Gas Co. has filed an application for authority to merge. If the merger is authorized, the two companies will form a corporation with assets totaling approximately $155,000,000. Assets of Los Angeles Gas & Electric Corp. total approximately $80,000,000, and of the other company approximately $75,000,000.

The application was filed in San Francisco with the California Railroad Commission, which soon will set a date for public hearing to be held here.

A. B. MacBeth, Southern California Gas Co. president, and Addison B. Day, head of the Los Angeles Gas & Electric Corp., issued the following statement:

"In anticipation of the proposed merger, the commission recently announced that the two corporations had agreed to a reduction in gas rates in the amount of $1,000,000 a year to be effective on all regular meter readings taken on and after April 1.

"Unification of facilities and standardization of practices will result in better service and greater convenience to all gas consumers of the companies. The managements have given the proposed merger their most careful consideration and are satisfied that its consummation will result in more efficient and more economical operation and will be for the best interests of the consumers, shareholders and companies."

Under the proposed merger each share of the 6 per cent preferred stock ($100 par value) of Los Angeles Gas & Electric Corp. will become four shares of the 6 per cent preferred stock, Series A ($25 par value) of Southern California Gas Co., the surviving corporation, it was explained.

After the proposed merger is authorized, it was pointed out the matter will be submitted by the corporations to their shareholders.

Both corporations now distribute natural gas in Los Angeles and many other incorporated and unincorporated territories in Los Angeles County, among a total of 650,603 customers.

Southern California Gas Co. also distributes natural gas in San Bernardino, Riverside, Tulare, Kern, Kings and Fresno counties.

Kansas City Franchise

An ordinance to grant the Kansas City Gas Co. a new 30-year gas franchise is before the Kansas City, Mo., city council for a vote. The company's franchise expired last September.

Pecos Wildcat Showing

FORT WORTH, Tex., Mar. 22.—E. R. Minshaw and others No. 1 J. B. Banker, section 25, Block 146, T.&St.L. Survey, a couple of miles northwest of Fort Stockton, in Pecos County, is cleaning out and showing 100,000 feet of gas per day after a 90-quart shot at 2,910-70 feet.

Bradford Gas Rate

HARRISBURG, Pa.—The Public Service Commission has asked two Bradford gas companies to file reduced rates but refused to call off its investigation as requested by the utilities.

United Natural Gas Co. and Manufacturers' Gas Co. of Bradford, promised the commission to reduce their rates for consumption over 3,000 feet if the commission would discontinue its investigation. The study was ordered in November.

In letters to the two firms the commission said it would take the revised tariffs for study but would not agree to stop the inquiry.

Bradford city council told the commission recently it would drop its complaint against the utility rates and asked the PSC to accept the reduced tariffs. The city council also requested the commission to stop its investigation.

To Compel Odorization

AUSTIN, Tex.—As a consequence of the New London school disaster bills compelling the use of odorants in gas were introduced in the legislature this week.

Tear gas or substances which irritate the eyes and nose would be required to aid in the detection of escaping gas. The Railroad Commission would be empowered to promulgate rules, tests and investigations to govern the odorization of artificial and natural gas.

Any person, firm or municipality in any way handling and supplying gas to any public building or to the public generally would be subject to the law. Rules governing the injection of malodorants would be required to be promulgated by the commission within 30 days.

Violation of the act would subject the person and officer of the company to a fine of $1,000 a day for each noncompliance. Corporations violating it would be subject to forfeiture of their right to do business.

Columbian Carbon Report

The annual report of President F. F. Curtze, of Columbian Carbon Co., said sales for January and February increased 20 per cent over the corresponding months of 1936. A substantial increase in carbon black production is planned in the current year.

The report stated that the company had completed a factory for production of dustless carbon black, with a capacity of 16,000,000 pounds annually. An addition is now under construction which will increase its capacity 50 per cent.

Columbian also purchased the carbon black factory of Keystone Carbon Co. in Monroe, La., field, adding about 3,000,000 pounds yearly to its export business. Its subsidiary, Peerless Carbon Black Co., erected a plant for the manufacture of high-grade black at Hickok, Kan., using in part materials removed from Pioneer, Tex.

Research activities were continued during the year, and expenditures of this nature by all departments amounted to more than $100,000. The company shortly will complete in Brooklyn, N. Y., a carbon black research laboratory which will be outstanding in design, equipment and completeness, Mr. Curtze said. Field laboratories in the meantime will be maintained in Louisiana and Texas.

Appeal California Rate

WASHINGTON.—The California Railroad Commission has appealed to the Supreme Court in its effort to regulate gas rates charged by the Pacific Gas & Electric Co., which operates in central and northern California.

It sought a review of a ruling by a three-judge federal district court enjoining enforcement of an order which the state agency estimated would reduce annual revenue of the company by $1,744,881.

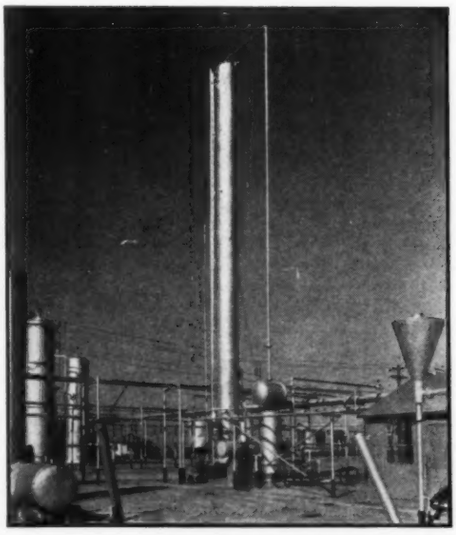
New York-Pennsylvania Gas

COUDERSPORT, Pa., Mar. 20.—The second failure in as many weeks was completed in Warren County, Pennsylvania, when the Sylvania Corp. abandoned its wildcat test on the M. W. Jamieson farm, Kinzua Township, at 4,823 feet after it began flowing salt water at the rate of 5 bbls. per day. This test drilled through the Oriskany at 4,799-4,819 feet.

It was the only completion of the week in the New York-Pennsylvania deep sand gas fields.

The Potter Development Co. is drilling at 5,065 feet in its test on the Crawford Estate farm, Keating Township, and at 4,714 feet on the L. C. English farm, Harrison Township, Potter County. G. L. Cabot, Inc., is shut down at 4,305 feet on the

Natural Gasoline



New stabilizing equipment recently installed in Empire Oil & Refining Co.'s Burrton, Kans., gasoline plant

Cabot Enters Gasoline Industry

The Godfrey L. Cabot interests of Boston, Mass., manufacturers of carbon black, with plants scattered throughout the Texas Panhandle and West Texas areas, contemplates building two natural gasoline plants in the West Texas gas field. The company expects to locate one 20,000,000-foot plant in Winkler County and one of the same capacity in Ward County, the two units to manufacture close to 45,000 gallons of natural gasoline daily. At present, the company does not indicate that it will build a carbon black plant to utilize the residue gas.

Proposed Sinclair Plant

The Sinclair Prairie Oil Co. is making plans for the construction of a natural gasoline plant in Moore County, Texas. The capacity of the plant will be between 40,000,000 and 70,000,000 feet of gas.

Enlarging Armstrong Plant

The Cabot Carbon Co. is increasing the capacity of its Armstrong carbon black plant, Moore County, Texas, from 10,000,000 to 25,000,000 feet in order to handle an additional 15,000,000 feet to be furnished by the Skelly Oil Co.

R. E. Courtwright farm, Harrison Township, and Ward Wasson has run and cemented casing in his well, down to 5,310 feet, on the W. B. Hall farm, Genesee Township, and other current Potter County operations.

Potter Development Co. remains shut down at 4,928 feet on the Lessor and Launer farm, Kinzua Township, Warren County. Updegraf has the rig up for a test on the C. E. Erickson farm, in Elk Township, this county.

G. L. Cabot, Inc. is drilling at 85 feet in the newest Tioga County test on the Union Joint Stock Land Bank property in Brookfield Township. Potter Development Co. is drilling at 2,900 feet on the C. G. Dearman farm, Middlebury Township, and is fishing at 1,845 feet on the H. C. Kemp farm, Farmington Township.

In the more remote wildcat tests, McKenry and others are drilling at 2,896 feet on the Stellman farm, Rockland Township, Venango County, and Potter Development Co. is drilling at 3,085 feet on the J. Chapin farm, Rockdale Township, and is building the rig for a test on the N. D. Dahl farm, Hayfield Township, both in Crawford County.

Allegany and Steuben counties are sharing the activity in New York state, each with three wells drilling.

Kaufman and others are drilling at 2,240 feet on the Bank of Angelica property, Allen Township, and Empire Gas & Fuel Co. at 2,610 feet on the J. Mulvey farm, Alma Township, Allegany County. G. L. Cabot, Inc. is running casing in its well on the Lee Harder No. 2 farm which has been drilled to 4,655 feet. This well topped the Onondaga at 4,636 feet.

G. L. Cabot, Inc. is drilling at 1,205 feet on the T. H. Wing farm, Greenwood Township, and Sylvania Corp. at 605 feet on the William Hendrickson farm, Troupsburg Township, in Steuben County. Atwater and others are rebuilding their rig on the Herrington farm, Woodhull Township.

Cunningham Natural Gas Co. is drilling at 1,790 feet on the H. Hotchkiss farm, Randolph Township, and Belmont Quadrangle Drilling Co. is moving in on the A. G. Hoffler farm, Leon Township, Cattaraugus County.

Amarillo Gas Co.

Amarillo Gas Co., subsidiary, and Southwestern Development Co., parent company, have filed a joint declaration with SEC under the utility act in connection with issuance of a $450,000, 4 per cent promissory note due serially to July 1, 1941. Amarillo Gas applied as the issuer and Southwestern Development as the guarantor. The subsidiary will refund its outstanding 6 per cent first and refunding mortgage bonds due serially to August 31, 1939.

Amarillo Gas filed an application for approval of the acquisition by it of a $225,000 4 per cent promissory note to be issued by Panhandle Pipe Line Co., a subsidiary of Southwestern Development, to enable Panhandle to redeem all of its 6 per cent first mortgage bonds owned by Amarillo Gas Co. Hearings will be held March 27.

Tulsa Accountants

At the meeting of the Petroleum Accountants Society of Tulsa to be held at 6 p.m. Friday, March 26, in the Mayo Hotel, R. D. Robey, Jr., will be guest speaker, taking as his subject, "Practical Side of Drilling from the Making of the Location to Bringing In of a Well."

Eason Well a Real Gusher

Eason Oil Co.'s new well, in section 13-17-1w, which extends the Langston pool in Logan County, Oklahoma, a half mile, was opened three hours Monday and flowed 1,318 bbls. of high gravity oil, or at the rate of 10,544 bbls. per day.

WASHINGTON, D. C.—Senator Connally of Texas announced a senate bill to extend his "hot oil" act beyond June 16, will go before the senate finance committee this week.

Pipe Line Activity

Far North Pipe Line

TORONTO, Ontario.—Announcement has been made by G. Harrison Smith, president of Imperial Oil, Ltd., of the projected laying of the first oil pipe line within the Arctic Circle. To overcome a a major difficulty in Arctic fuel oil shipment, the Imperial company is undertaking construction of an 8½-mile oil line along Bear River Rapids, in the Northwest Territories. Imperial Oil has three wells at Fort Norman which supply the requirements of the Eldorado Gold Mines at Labine Point, in the Great Bear Lake mining area. The oil is

Cutting ditch for the new line through wooded section of the right of way. Unable to use side sloppers on the ditching machine, the ditch almost fills up as soon as the machine has moved forward

transported by water, and it has hitherto been necessary to portage past the rapids, which are impossible to navigate. The pipe line to eliminate this necessity will probably be in service this summer. Storage tanks are also to be built.

Pure Okmulgee Line

Pure Oil Co. has let contract to B. & M. Construction Corp. for a 12-mile 6-inch oil line to be laid near Okmulgee, Okla. The line will be oxy-acetylene lindewelded, using the stove pipe method.

Trans-Pecos Line

McCAMEY, Tex. — Construction of a 33-mile trunk line from Maljamar and other fields in southeastern New Mexico to Lynch station in Texas by Trans-Pecos Pipe Line Co. will be started as soon as the pipe can be placed on the ground, according to F. A. Hornaday, of San Antonio, president of the company. The proposed line will intersect the trunk line of the Texas Co. at Lynch station and the oil will be transported through it to its Gulf terminals.

Mr. Hornaday and associates, it is said, have contracted with the Italian government to supply oil from the New Mexico fields, covering a six-year period. The oil will be destined for Trieste, Italy, to supply the new refinery.

The Trans-Pecos Pipe Line Co. will erect three 55,000-bbl. steel storage tanks, two at Lynch station and one in the field.

Panola Gas Line

United Gas Public Service Co. has completed laying a 2-inch line from its Latex-Houston trunk gas line to the two gas-producing wells of Glassell & Glassell in the newly discovered Panola County gas field south of Carthage, Tex.

Refinery Projects

Kansas Refinery Being Built

A new refinery with an estimated capacity of 1,500 bbls. of crude per day is being built at Shallow Wells, in Scott County, Kansas, to handle oil from the three Mississippi lime wells of the Atlantic Oil Producing Co., located near the town of Shallow Wells. This plant is being built to make road oil principally and while the oil is of 24 to 26-gravity it is believed that by using the vacuum process incorporated in this plant design at least 50 per cent of the crude will be converted into a good grade of road oil for which there is an active market demand. The other 50 per cent cut will be made into gasoline, about 15 per cent, and diesel fuel and fuel oil.

This plant is being financed by John Allison and John Dryden, both of McPherson, Kans., the company being known as the Shallow Water Refining Co. Engineering work is being carried on under the supervision of Winkler-Koch Engineering Co., Wichita, Kans. The material to be used has for the most part been reclaimed from other refineries and is being furnished by the owners for an interest in this new plant. It is reported concrete foundations are being poured and it is anticipated the completed plant will be ready for operation in about six weeks.

Refinery Installs Diesels

COUTTS, Alberta.—British American Oil Co. refinery here recently installed new refinery equipment operated by diesel engines in place of motors.

California Production Division

Oil men from all parts of California are expected to attend the annual spring meeting of the American Petroleum Institute Division of Production, Pacific Coast district, at the Biltmore Hotel, Los Angeles, on April 13, 1937.

A. L. Weil, president, General Petroleum Corp. and of the California Oil and Gas Association, will speak on "The History of the Oil Industry in California." He will be introduced by L. L. Aubert, Bankline Oil Co., chairman of the Pacific Coast district.

The following papers will be presented: "Field Control of Drilling Mud," by P. H. Jones, Union Oil Co.; "Wire Line Core Barrel," by W. A. Clark, Texas Co.; "Rotary Table Horsepower," by C. S. Forsberg, Honolulu Oil Corp., Ltd.; "Plant Pipe Reclamation," by K. C. Hayes, Standard Oil Co.

At a session on production, papers will be presented on "Acidization of Oil Wells," by M. W. Morris, Standard Oil Co.; "Reconditioning Procedure with Portable Equipment," by H. E. Winter, Union Oil Co.; "Selection of Size of Oil Strings in Wells in California," by E. K. Parks, Standard Oil Co.

Committee chairmen in charge of plans include Howard C. Pyle, Union Oil Co.; program; Ralph Marshall, Oil Well Supply Co., arrangements, and Bruce Barkis, Rio Grande Oil Co., nominations.

National Petroleum Association Program for Annual Meeting

A program of exceptional interest has been arranged for the thirty-fourth semiannual meeting of the National Petroleum Association at the Cleveland Hotel, Cleveland, Ohio, April 15-16.

President Charles L. Suhr will preside at both general sessions. Although not on the program for a formal address, Mr. Suhr, as usual, will open the meeting with brief remarks pertinent to the current situation.

On Thursday afternoon, April 15, Wilmer R. Schuh, president of the National Association of Petroleum Retailers, will speak on the developments in petroleum marketing which have come about in consequence of the adoption of the so-called Iowa Plan. The title of his remarks will be "Pilgrim's Progress of Petroleum Retailers."

Whiting Williams will speak on "Management and Labor in 1937.". Mr. Williams will describe his observations and convictions gained from first-hand impressions by donning overalls and working side by side with laborers in industrial projects in this and foreign countries, including U.S.S.R. and Germany.

Col. Ernest O. Thompson, member of the Railroad Commission of Texas, will speak on "The Importance of the Interstate Oil Compact to the Oil Industry in the Eastern Territory."

Dr. Henry M. Busch, professor of sociology and head of the division of social sciences of Cleveland College, Western Reserve, will speak on "The Foreign Situation and the American Oil Industry" at the general session Friday morning.

John Benson, president, American Association of Advertising Agencies, is to speak on "A Philosophy of Advertising for the Oil Industry."

Ellsworth C. Alvord, Washington, D. C., will discuss technicalities of federal taxation.

Fayette B. Dow, general counsel, will base his remarks on "The Value to the Public of the Oil Industry as a Free Enterprise."

An outstanding group meeting during the two days' session will include a discussion on "Recent Problems in Lubrication," featuring remarks of H. C. Mougey, chief chemist, research laboratories section, General Motors Corp.

The Fellowship Supper will be held this year at the Cleveland Club. The Canfield Oil Co., the National Refining Co. and the Standard Oil Co. of Ohio will provide the entertainment.

The members of the entertainment committee are H. M. Carruth and A. L. Bailey, Canfield Oil Co.; C. S. Smith and H. W. Kuegler, National Refining Co.; A. M. Maxwell and M. R. Bower, Standard Oil Co. of Ohio.

Pan American Minority Asks For Restraining Order

NEW YORK.—Standard Oil Co. (Indiana) was accused of trying to stifle competition from Pan American Petroleum & Transport Co., which it controls, in a suit filed in Supreme Court by minority Pan American stockholders. An injunction to restrain the Standard interests from influencing Pan American policies was sought.

Louis Blaustein, Pan American president; his son, Jacob, executive vice president, and American Trading & Transportation Co., controlled by the Blausteins, were the plaintiffs. They claimed ownership of about 20 per cent of Pan American's stock.

In addition to the Indiana company, the defendants included Standard Oil Co. of New Jersey.

Mr. Blaustein accused Standard interests of forcing Pan American into a contract with a Standard subsidiary for its oil supply which, he charged, had resulted in an overcharge of $8,000,000 in the last four years, and of forcing it into transportation contracts with Standard pipe line subsidiaries which had, he claimed, resulted in overcharge of $6,000,000 in the same period.

Pacific Western Meeting

Charles F. Krug, Jr., was appointed secretary and D. T. Staples was made assistant secretary of Pacific Western Oil Corp. at the annual meeting of stockholders. Mr. Krug succeeds Arthur M. Boal, and Mr. Staples succeeds W. G. Sibson. William G. Skelly, Tulsa, recently elected a director and president of Pacific Western, presided. Included in operating plans discussed was a program involving expenditure of several million dollars for drilling in Kansas, Texas and California during 1937. Stockholders approved an amendment to the bylaws, which would provide for removal of directors by vote of a majority of stockholders at an annual or special meeting, or upon written demand of a majority of stockholders.

As of March 15, Pacific Western Corp. held 631,208 shares of Mission Corp. stock, a small increase since the end of 1936 when it held 630,174 shares.

SEATTLE, Wash.—The bill to increase the state's gasoline tax from 5 to 5½ cents a gallon has been enacted by the legislature. It is believed Governor Martin may veto it.

THE MARKETS*

CRUDE OIL: ***Continued climb in crude oil production with additions to storage reflected in concern as to future price trends. Reductions in allowables are planned by at least three states for April. No indications of actual weakness in crude market with many buyers anxious to make additional well connections.***

REFINERY: ***California gasoline prices higher with some improvement noted in low octane material in Mid-Continent and Middle West. Inter-refinery buying of gasoline continues with inquiries reported for delivery later in spring. Furnace oil and kerosene prices lower where any changes reported. Residual fuels strong with heavy foreign demand.***

TANK-WAGON AND SERVICE STATION: ***Standard of California advances retail prices of all grades of gasoline one-half cent in western states. No important changes in other areas.***

FINANCIAL: ***Eastern financial circles predicting higher price levels for both crude oil and refinery products by late spring. Average prices for common stocks lower in line with general market trend. Average of 30 representative stocks for week ending March 20: High, 44.48; low, 42.05; close, 42.52. For week ending March 13: High, 45.26; low, 42.82; close, 43.94.***

**Detailed information in Market Section.*

Bolivia Cancellation Held To Be Without Basis

Declaring the Bolivian government's contentions are without substantial merit, Walter C. Teagle, president of Standard Oil Co. (New Jersey), said last week that a subsidiary, Standard Oil Co. of Bolivia, will defend itself against cancellation of concessions in that country. The Bolivian government issued a decree March 16 canceling the Standard of Bolivia concession and confiscating its holdings, asserting the company had defrauded it by exporting petroleum without paying royalties.

Mr. Teagle said it was his understanding the government's contention relates to an incident in 1925 or early 1926 when 704 tons of crude were transported by the company across the Bermejo River, the international boundary between Bolivia and Argentina.

"The crude was used as fuel on another well being drilled by Standard Oil Co. of Argentina, another subsidiary, on the other side of the river," Mr. Teagle said. "The transfer of this small quantity of oil was handled in usual course by the company with the Bolivian customs, and a certificate of origin was issued by the Bolivian officials. The Argentine government also issued a permit for the import and this was also a matter of public record."

Mr. Teagle added that the only controversy between Standard Oil Co. of Bolivia and the Bolivian government has been in regard to rentals on the concession. This controversy is based on the date when the concession reached the production stage. This question has been pending in the Bolivian courts since 1931, and still awaits final decision.

Lance Creek Royalty

The Department of the Interior announces it has rejected a bid submitted on February 15 for the purchase of the royalty oil accruing from leases on government land in the Lance Creek oil field, Wyoming. The single bid received was rejected because it was not in the form prescribed in the "call for bids" issued December 31, 1936.

To Head Paris Delegation

J. Garfield Buell has been appointed by the International Petroleum Exposition to head a committee to arrange for a delegation of oil men to attend the World Petroleum Congress in Paris June 14 to 19. The delegation will present an invitation to the congress to hold the 1940 meeting in Tulsa in conjunction with the International Petroleum Exposition. W. G. Skelly, president of the Exposition, informally presented an invitation to the Institution of Petroleum Technologists, sponsors of the Congress, at a meeting of the American division in Chicago last November, which has been forwarded to the London headquarters of the Institution.

J. GARFIELD BUELL

Pennsylvania Grade Meeting

The Pennsylvania Grade Crude Oil Association will hold its fourteenth annual meeting aboard the S. S. Seeandbee, a Great Lakes steamer, June 10, 11, and 12, 1937.

The ship will sail from Buffalo, N. Y., at noon Thursday, June 10, proceed across Lake Erie, through the Detroit River and into Lake Huron on the second day. It will return to Buffalo, covering the same route, a total distance of more than 700 miles.

Superior TYPE "C" PUMPING ENGINE

Simple in design . . . rugged in construction . . . complete enclosure for protection against dust and sand. Convertible for operation on either gas or oil with equal efficiency.

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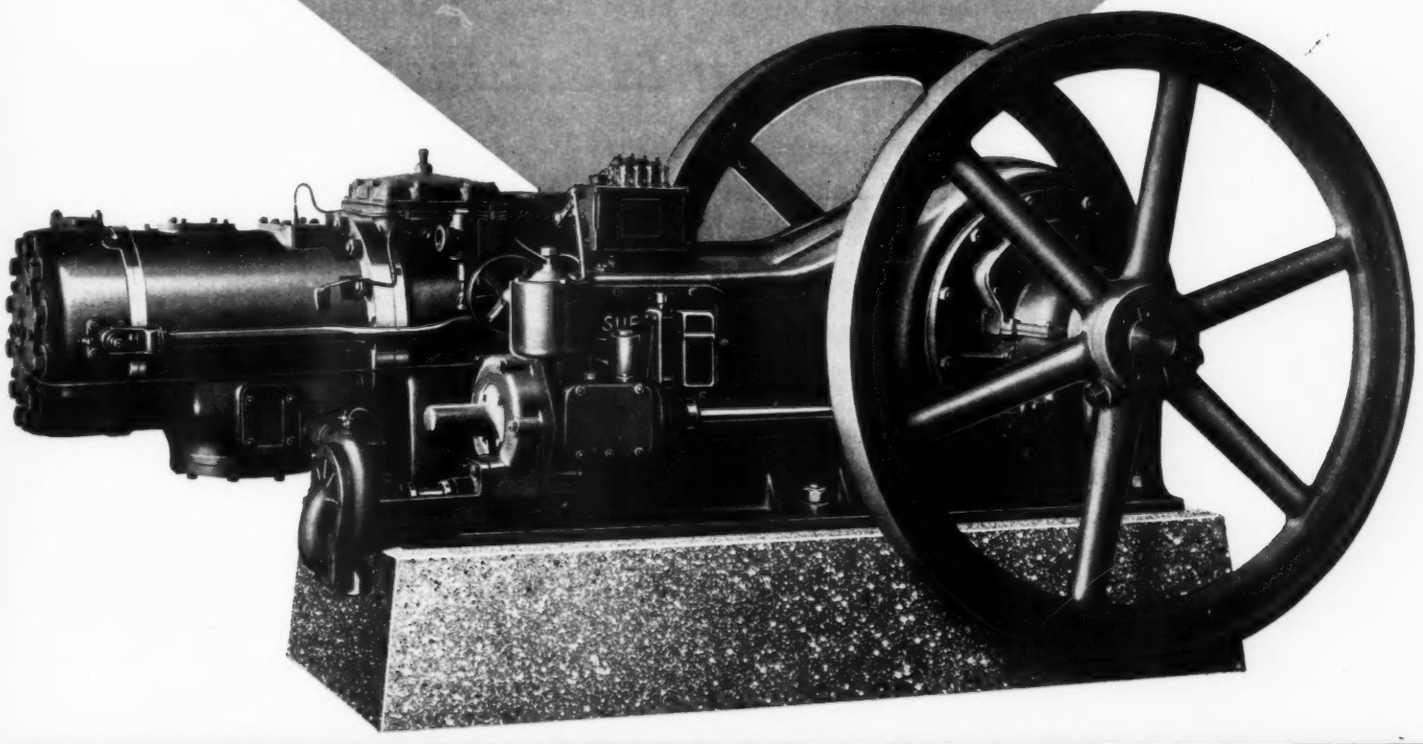

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The OIL AND GAS JOURNAL

PRODUCING REFINING NATURAL GASOLINE PIPE LINE

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Conservation in Manufacturing

A perusal of the engineering and technical data in the refining section of this issue of The Oil and Gas Journal strengthens the conviction that the petroleum refiner has an important position as a producer in conserving our present oil supply and adding to our future reserves.

While there has been only a very small advance in retined prices from the average price during the depression the refiner has been able with that slight improvement to do a great many things which have a direct bearing on stretching our supply of oil into the years to come.

He has constantly developed methods to get more out of crude from the standpoint of the more valuable products. He has obtained lubricants from oils not previously considered suitable for the manufacture of lubricating oils.

He is now taking refinery gases formerly wasted or burned as fuel and through polymerization securing a motor fuel of the highest quality. In fact, to a certain extent, it may now be said that refinery and fuel gases have been added to our petroleum reserves as a source of motor fuel.

Research directed towards elimination of knocking characteristics has developed a diesel fuel that has enabled manufacturers to furnish diesel power more cheaply and thus to greatly extend its uses.

All this has been accomplished with the gasoline price at the refinery averaging less than a cent per pound for the finished product. With a better price the refiner can still do a lot of things he can not do now. A start has even been made towards manufacture of synthetic products.

Hydrogenation with its possible 100 per cent yield of valuable products from a barrel of crude is much closer to commercial application than it was a few years ago.

Yet we are just at the beginning of that program which, as stated, has been carried through on little more than a depression price level. There is no question that, with any improvement, the refiner can go much farther than he has yet been able to with still greater gain in conserving our oil supply and giving the consumer improved products for wider uses.

And, after all, if we are to get the fullest benefit of our oil supply for the longest possible time, it will be as necessary to reduce waste in use as to avoid waste in production. The refiner is doing just that.

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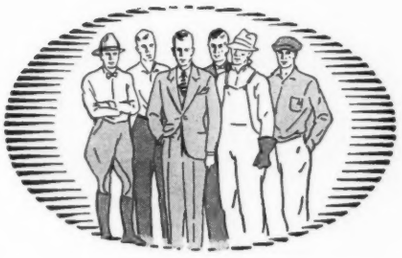
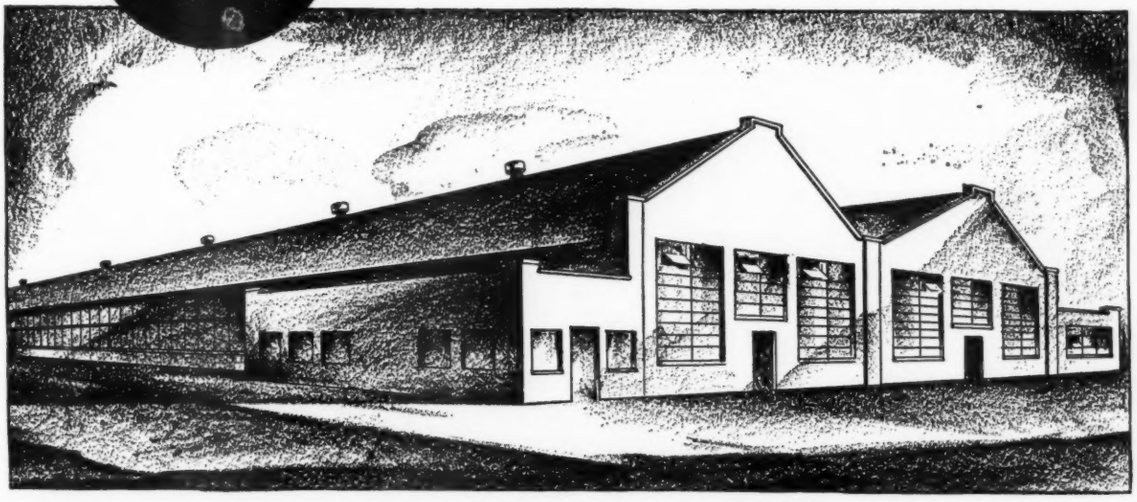


You who demand the ultimate in oil well pump and sucker rod development—you who appreciate the value of consistent service—you who look to the leaders for leadership—it is you who have made Axelson's newest expansion of service and manufacturing facilities a reality. On February 1st the reconstruction on Axelson's St. Louis plant was completed, doubling the size and capacity. In this plant are installed the most modern of heat-treating furnaces—the most accurate of machine tool equipment. New laboratory facilities, new testing and checking devices, make this factory second to none in the industry. Steadfastly adhering to a policy laid down 45 years ago, Axelson has invested hundreds of thousands of dollars to enable them to keep one step ahead of industry's demands. From machinist to executive, Axelson's policy continues to be "Service Begets Sales."

AXELSON SUCKER RODS ARE HEAT TREATED FROM END TO END

Axelson's St. Louis plant has installed furnaces and equipment which makes possible the heat treating of sucker rods from end to end.



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DEEP WELL PLUNGER PUMPS **AXELSON** SUCKER RODS

Gas-Lifting Methods Receiving Wide Attention in East Texas

By MITCHELL TUCKER

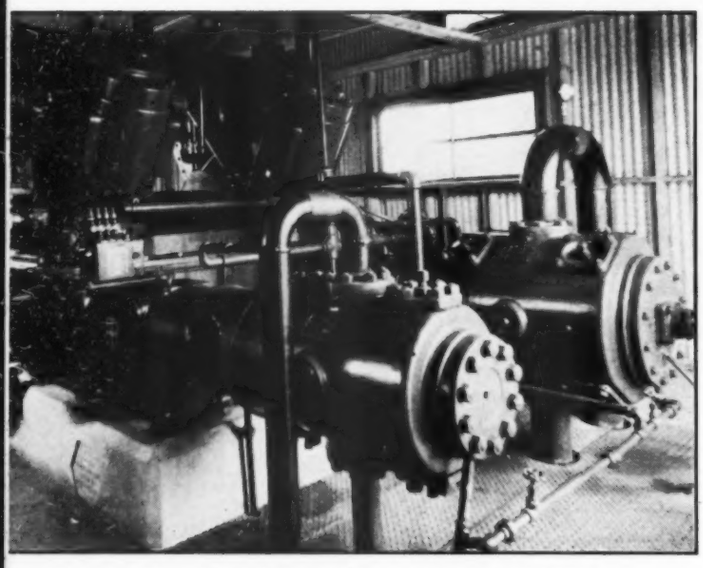

Fig. 2 — Two-stage four-cycle compressor station in permanent installation. The unit at present is supplying energy for 11 wells but is capable of handling 21 wells when needed.—(LeDoux, Shreveport)

In seeking an economical and practical solution to the mechanical lifting of oil in the East Texas field, now conceded to be one of the major engineering problems before operators there, the increasing use and successful application of gas-lift methods is receiving widespread attention.

The problem of gas lift in East Texas is a composite one, varying widely between different operators according to their facilities to employ the method. Those companies operating or connected to compression gasoline plants, and equipped to utilize the enriched residue after recycling, are becoming extensive users of gas lift. Those companies not so equipped, usually operating a few wells on several scattered leases, must look at the problem from an entirely different standpoint and consider the economics of this method and the probability of producing their wells to exhaustion by gas lift.

The East Texas operators were particularly fortunate in having the benefit of many years research and experience in gas lifting in all types of fields. The history of gas-lifting from its beginning in Pennsylvania a century ago has been one of trial and study, and the favorable and unfavorable experience gained throughout these years has made possible the recent advancements in design and application.

GREAT PROGRESS MADE

The history of gas lifting records many sporadic efforts, many highly successful installations, and many complete failures, but from the original idea of pressure application jetting fluid from as low a depth as possible, great progress has been made.

Of great importance to gas lift generally has been the results of detail study of tapered-tubing strings, for therein was worked out by emminent engineers the basic idea of the modern flow valve, namely, when a column of oil is aerated properly by natural gas it will flow to the surface by virtue of its own lightness.

The questionable ultimate results of straight gas lift was followed by experiments with perforated and tapered tubing strings, by kick-off valves, and the so-called stage-lift valves, and of recent years a large number of devices employing the "pneumatic pump" idea, and lately, fluid velocity-controlled flow valves.

Flow valves today are precision devices, for the most part controlled by differentials in pressure between the casing and tubing, and capable of adapting themselves automatically to rather wide variations in flow conditions.

Bottom-hole intermitting devices, governed by fluid level and not by time, are the latest developments in gas lift for fields such as East Texas, and where stripper production is prevalent.

USE OF GAS LIFT INCREASING

Due to the efficient proration measures applied in East Texas, whereby volumetric withdrawals have been controlled within the limits where an abnormal drop in reservoir pressure would not be suffered, the extended use of gas lifting and other artificial means of producing have been retarded. Now it is conceded, however, that the problem of mechanical lift is one of the most important before petroleum engineers in that field today. An increasing number of marginal wells show themselves unable to flow their daily allowable naturally, and as the band of mechanically produced wells continues to enlarge not only on the western flank, but all along the eastern side of the field, in the solution of this problem, gas-lift methods are coming in for a large share of attention at the present time.

Restrictions upon the manner of applying gas lift were made early in the life of the field by Texas Railway Commission, which prohibited the application of pressure directly upon the face of the sand. These restrictions still remain in effect. Later developments in the manner of installing flow valves have been made to meet this restriction. Standing valves and effective packers are installed just above the casing seat with perforated tubing sections above and below. In this manner the fluid head is permitted to rise at a constant level in both the tubing flow column and the annular column between tubing and casing. The pressure applied down the annular space is thus kept off the sand face. By the use of flow valves it is possible to start the flow of fluid at a pressure far less than the actual bottom-hole pressure in the well, and the working pressure thus is only a percentage of the bottom-hole pressure, thereby eliminating all danger of forcing oil, gas or water back into the formation, and removing the objection to this method of production from a conservation standpoint.

FLOW AND KICK-OFF VALVES

The line of demarcation between flow valves and kick-off valves has often been difficult to define, but flow valves are generally defined as those devices installed at predetermined intervals in the flow string that open whenever a given load is above them, and close when this load is removed. Kick-off valves are generally defined as devices similarly installed and when once closed by gas velocity do not reopen unless casing and tubing pressures are approximately equalized. There are many variations of these types manu-

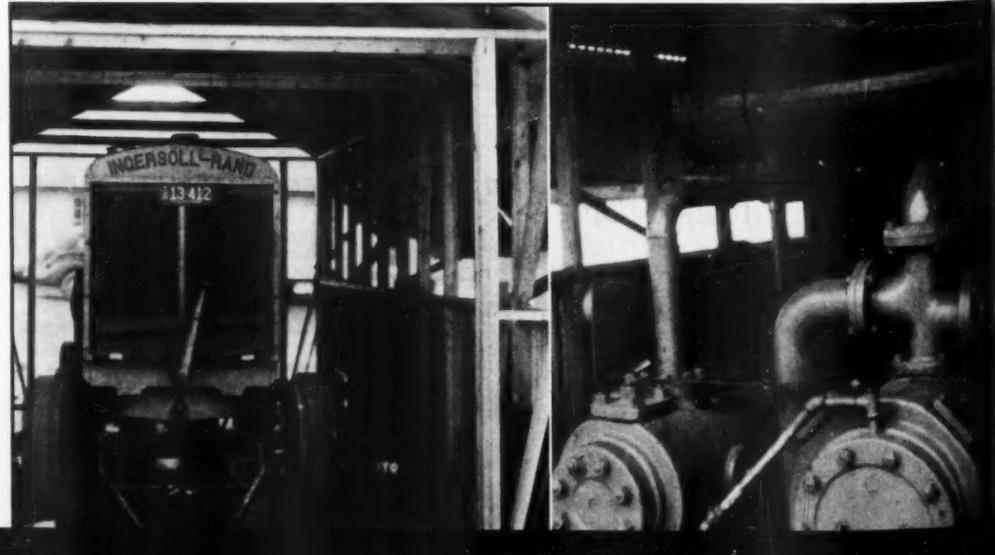

Fig. 1—Front and back views of a portable two-stage compressor unit now handling 19 wells.—(LeDoux, Shreveport)

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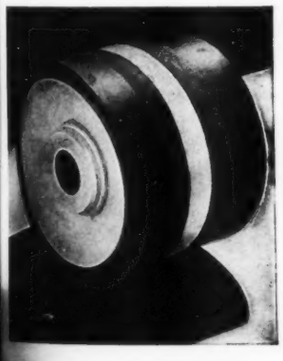

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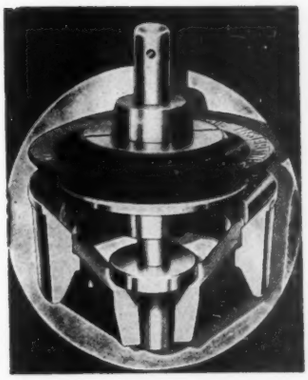

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factured, all of which have their individual characteristics.

Humble Oil & Refining Co. pioneered the use of gas lift with flow valves in the East Texas area several years ago. There operations are part of a planned program whereby their London and Kilgore gasoline plants are operating as great central powers, and are accomplishing three purposes: Lowered production costs; conservation of available residue gas; and efficient operation of gasoline plant. Also, this procedure more than justified plant operation and enlargement during those years when gasoline prices were so low that profits were hard to realize.

This company is at present the most extensive user of gas-lift methods, and is extending the practice. Other major operators are using, or are planning to use gas lift wherever gasoline plant facilities are available.

At the same time, many smaller operators are giving increased consideration to the feasibility of employing gas lift on individual tracts through the use of permanent or portable compressor stations. The major point of consideration by such operators is with respect to economics of gas lift, and whether or not this method can be employed to produce their wells, regardless of water percentage or fluid level, to economic exhaustion. The increasing available data on such installations are serving to establish gas lift as a practical means of producing such properties.

One prominent company, finding its warehouses stocked with a large number of used electric motor-driven compressor units from other fields, is planning to utilize them in the construction of portable electrical compressor stations. Although they will be needed only from one to two hours daily, by adjusting their schedule of operation on different leases, the simultaneous demand billing charge for purchased electrical power will be at a minimum. It is tentatively planned to continue this practice from the time their wells stop flowing until such time that the fixed charges by this method exceed the estimated charge for standard pumping. It may be established, of course, that the method will be feasible throughout the entire life of the wells so produced.

The amount of injection gas required to lift a barrel of oil increases, of course, as the absolute bottom-hole flowing pressure decreases. It is a matter of record that sufficient gas remains in solution with the oil in East Texas reservoir, even with a small back pressure, to flow the wells naturally until bottom-hole pressure declines to about 875 to 900 pounds. Probably the flowing life could be extended until the reservoir pressure has declined to around 650 pounds if no back pressure were carried on the well, or if it were not necessary to close the wells in periodically to conform to proration restrictions.

STUDY BEING MADE

The engineers of the railroad commission are now making a detailed study of this problem, and are making accurate pressure measurements and tests on all wells as they cease flowing naturally. They hope to determine from these experiments at just what pressure flow will stop, and other characteristics of flow.

After the flowing pressure has declined to the critical point, a condition is reached where there is insufficient gas associated with the oil to perform the lifting operation, and at this stage gas lift enters the picture by supplying the deficiency of gas in the flow column from an outside source.

The quantity of injected gas required to lift a barrel of oil is about 220 feet per 1,000 feet of lift under good flowing conditions in East Texas.

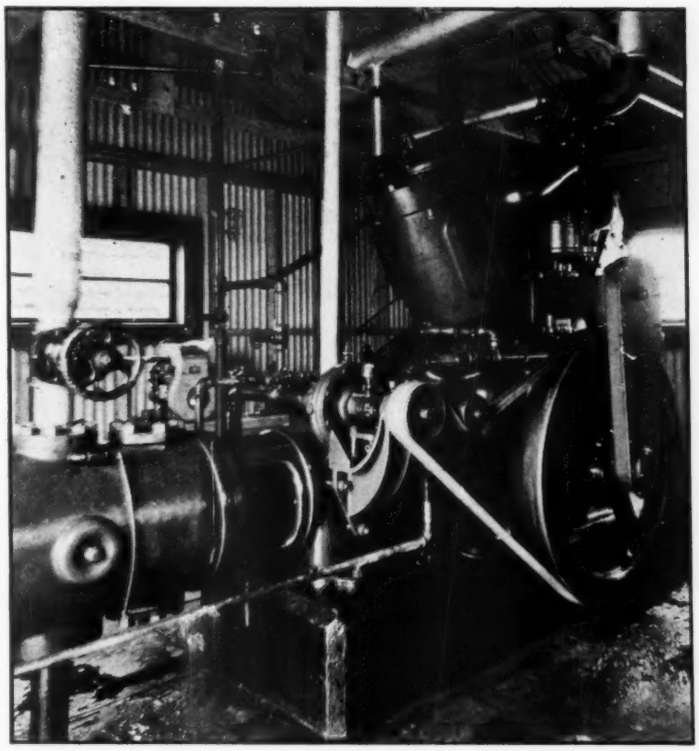


Fig. 3—Permanent installation of two-stage single-cylinder unit capable of handling 9 wells.—(LeDoux, Shreveport)

This ratio varies widely in individual wells depending upon the type of equipment used and local conditions.

VARIOUS CONDITIONS MET

When water makes its appearance in appreciable quantities, a different set of conditions must be dealt with. Obviously, inasmuch as little gas becomes associated with the water, a mixture of oil and water is more difficult to lift than a column of oil. Consequently, the quantity of gas required for lifting such a mixture is greater than would be in the case of oil alone.

Gas lift is applied to water wells in much the same manner as oil wells. The quantity of gas required to lift water is about 30 per cent greater than is required for oil. In cases where large quantities of water must be lifted, casing flow can be resorted to. Casing flow was developed in areas other than East Texas, and can reach rates up to 350 bbls. per hour with much lower input gas ratios than tubing flow. Due to production restrictions and the salt water disposal problem, little development along this line is being done, even in the more extreme water areas.

The chief expense in connection with gas lifting is that of compressing gas or air to the desired pressure for lifting the oil. A minimum amount of working surface equipment is required, consisting of the compressor unit and the necessary gas transmission lines carrying approximately 300 pounds pressure. As before stated, leases receiving return residue from gasoline plants equipped to provide the needed pressures are in an advantageous position in that they require no compressing units. For those leases not so connected, a wide variety of satisfactory surface compressing units are employed. In one instance a portable two-stage compressor station has been mounted on blocks in an improvised shed, and is providing all the energy needed for 19 wells on three separate leases (see Figure 1). For other type of properties, where operators desire a permanent installation, two-stage four-cycle compressor stations are sometimes installed. The one shown in Fig. 2 handles 11 wells at the present time and is equipped to eventually handle all the 21 wells on the property. Where smaller units are desired, one similar to Fig. 3 is sometimes employed, that being a two-stage single-cylinder unit capable of handling nine wells, and at the present time handling four wells. In the larger gas-lift systems throughout the field, certain operators have found it desirable to construct rather elaborate booster stations to take gasoline plant residue at about 80 pounds and boost it through single stage to the desired pressure.

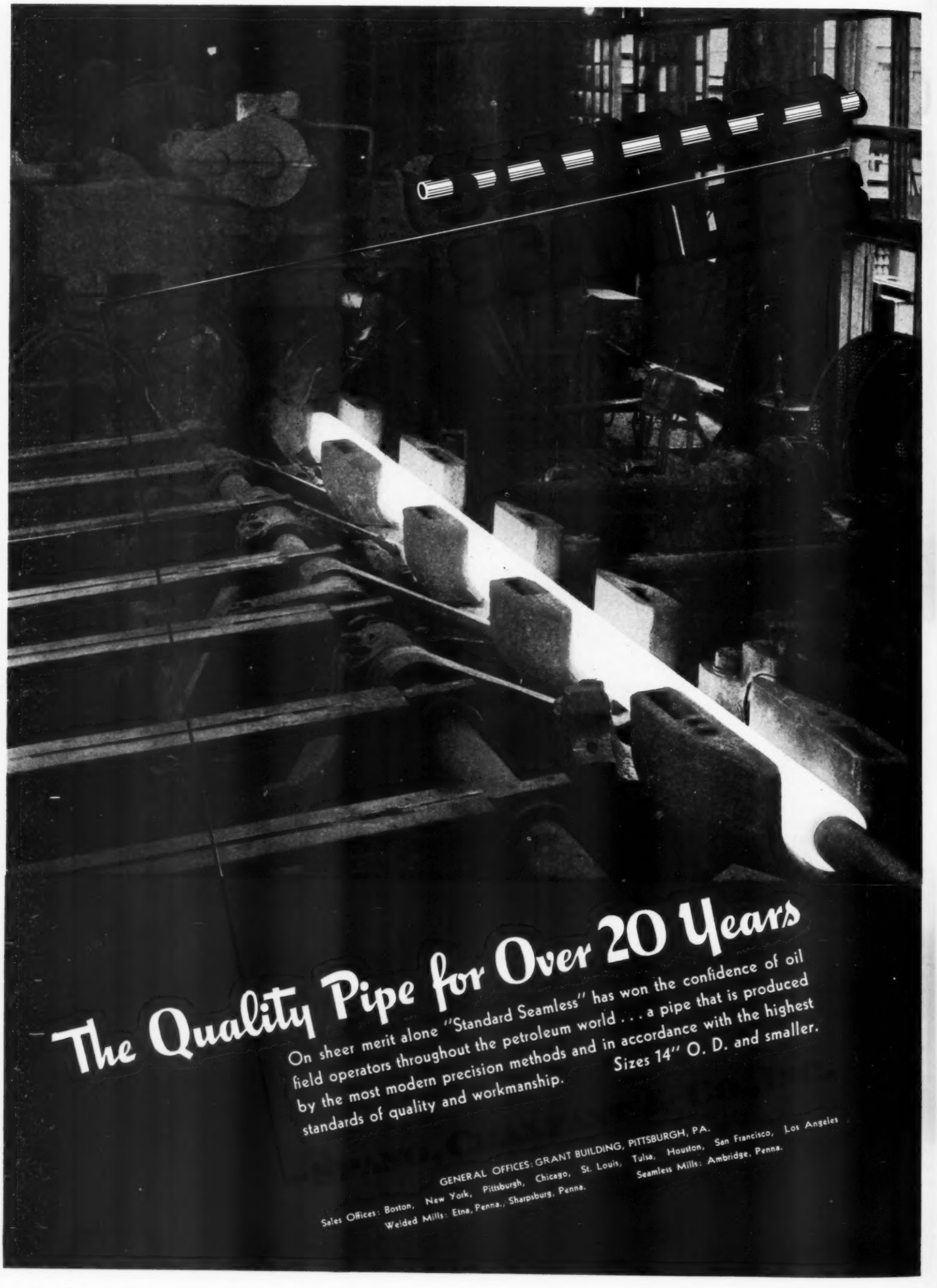
The valve installation usually consists of eight to 10 flow valves, a packer, and a standing valve, having a total cost of about $750. In instances where leases are being lifted as units, and costs can be accurately determined, they vary from $1,300 to $1,600 per well completely installed, depending upon the size of the lease involved.

Of great importance to the gas-lift operator in East Texas is the ever growing demand for casinghead gas products, particularly the lighter fractions (propane and butane) used in polymerization processes in coastal refineries, and for blending highly volatile motor fuels. Practically every gasoline plant in the field is either now equipped, or installing equipment at the present time, for increasing their production of these products. In recycling gas projects a maximum amount of these products are made available through the natural gasoline plants without sacrifice of crude oil quality.

Adapt Freedom Solvent Plant to Use Countercurrent Flow

Adaption of the continuous countercurrent contacting method in Freedom Oil Works Co.'s solvent extraction plant at Freedom, Pa., late in 1936 has proven successful and desirable in this refinery using "Chlorex" as a solvent. The tower for countercurrent contacting of "Chlorex" (B B' dichloroethyl ether) and oil was commissioned at the Freedom plant last fall and has operated satisfactorily for five months. Practically continuous operation has been carried on over the period of five months working on cylinder stock, bright stock and neutral. The tower built for this countercurrent contacting phase at the Freedom plant has performed with neutral charging stock at a rate of 600 bbls. per day with oil as the continuous phase and the solvent as the dispersed phase. Oils of high pourpoint may be treated with solvents in towers of this type without mechanical difficulty by proper control of the temperature in the tower and the temperature of the extract solution leaving the system.

Many advantages of the countercurrent method of contacting oil and the solvent in Freedom's plant over a system of settlers and mixers are claimed. The advantages, confirmed by Freedom's installation, include lower solvent holdup in the extraction system, high stage equivalence and thus higher yields of oil of given quality, simplification of operation, lower investment and less space requirements.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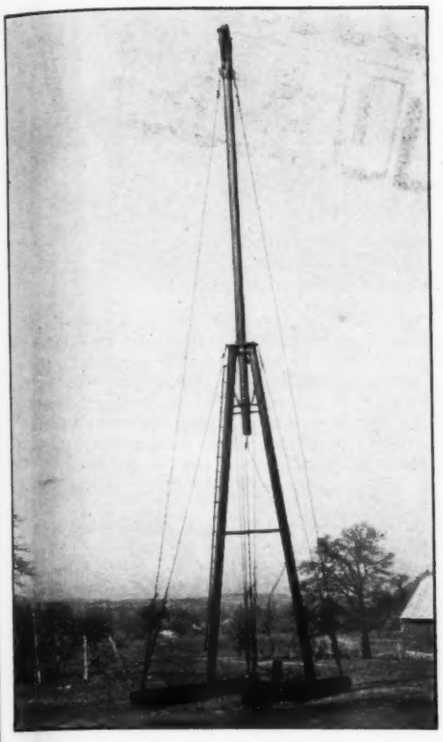
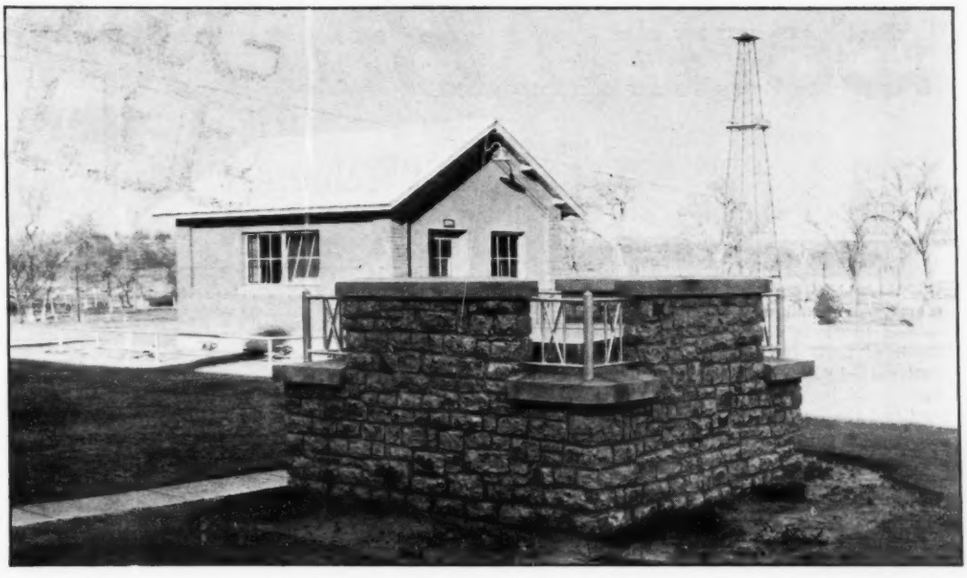
OPERATING IDEAS



Mast Mounted on Skids

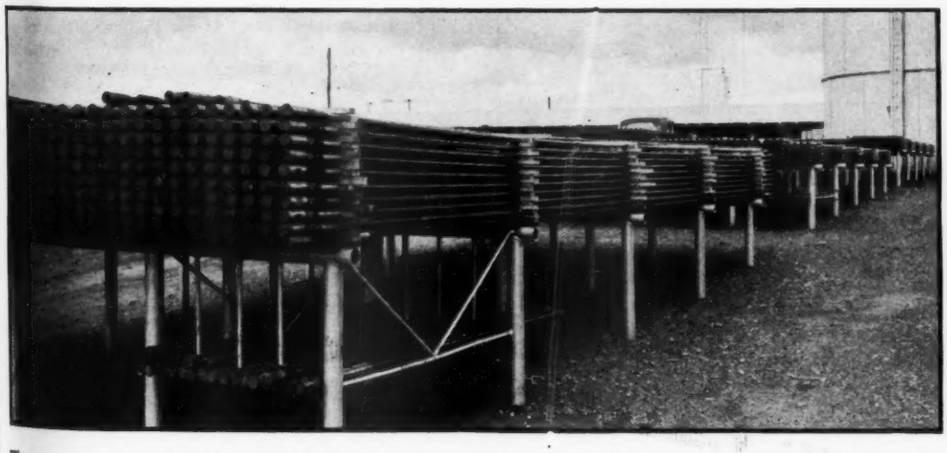
To facilitate servicing its wells and repairing rod breaks an oil company operating in the Olympic pool near Wewoka, Okla., has constructed the mast shown here which is mounted on skids so that it might be moved from well to well without dismantling or laying down. The skids are made from 10-inch casing and filled with concrete to lessen the tendency for the mast to be top-heavy. The gin-pole is adjustable to a maximum height of 50 feet. Both the gin-pole and supporting A-frame are guyed to the skids thus adding to the rigidity of the mast. A tractor is used to pull the mast in moving to new locations.

Water-Pump Housing Used to Beautify Station Lawn

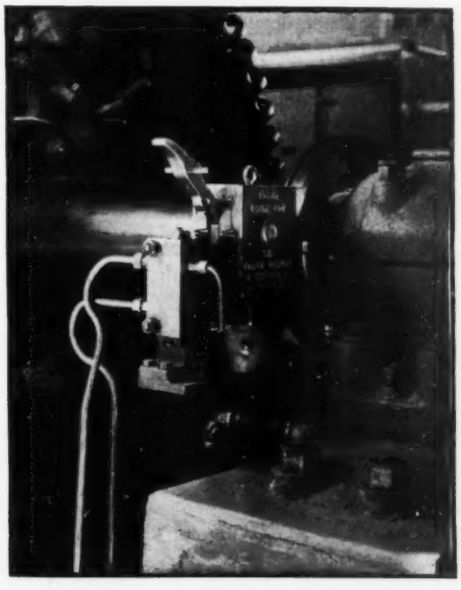


A major pipe-line company has a sunken electric water-pump for furnishing cooling water from a well on the lawn of its Drumright, Okla., pumping station. With the view of beautifying and landscaping the grounds the company engineers designed a stone and concrete housing for the pump and decorated the stonework with grills made from old welded pipe. The well and pump are covered with water-tight doors to prevent water dripping on the pumps.

Sucker-Rod Rack Made From Reclaimed Pipe



The proper care of sucker-rods before running them in the well is very important since improper racking in the storage yards and rough handling while hauling to the well may put a kink in the rods that would cause much trouble after the rods were in the well. To lessen this danger one oil company in the Ada pool has erected a rod rack from reclaimed pipe upon which the rods are stacked. The rods are properly spaced with stay cleats between layers of pipe and at a distance of every six feet. Also the protectors on each end of the rods are left on until they are hung in the derrick to lessen chances of becoming damaged while being hauled to the well.



Fuel Cut-Off for Diesels

A major oil company operating large diesel engines for power generation in the Osage County field of Oklahoma has installed safety stops on their slow speed engines to prevent the engines from turning at too fast a speed. The stop is constructed so that if the engine starts to run away, three small steel dogs revolving with the drive-shaft are thrown out and trip a device that cuts off the fuel supply to the diesel thus shutting down engine.

Geology of the South Burbank Pool

By E. O. MARKHAM and L. C. LAMAR
Geologists, Carter Oil Co., Tulsa, Okla.*

On January 5, 1935, the Mead Oil Co., Al Beck, Bridgeport Machine Co., and others, completed a well in the NE NE SW of section 10 25n-6e, for 1,647 bbls. of oil at a total depth of 2,857 feet in the Burbank sand. This well proved the contention held by many that a link would be found connecting the old Burbank pool and the Fairfax pool.

Sinclair Oil Co. drilled a well one-half mile north of the Fairfax pool, which had an initial production of 100 bbls., and Carter Oil Co. drilled several wells in sections 34 and 35-26n-6e. Both of these plays later proved to be on the edge of the South Burbank pool.

In spite of adverse economic conditions, intense interest was manifest in the area by both large and small operators. The highest price paid for a single lease of 160 acres was $342,000 and the lowest was $50.00.

The pool, as a whole has been carefully developed. During its early history, few operators depended on drillers for records of the wells with the result that information which could be obtained only by samples was lost, but since the first flurry of activity, accurate records have been kept, making a detailed study possible.

A total of 259 wells had been drilled January 5, 1936, in the pool proper, of which 245 were oil wells and 14 were dry holes. This is a very low percentage of dry holes for this type of pool, and is due to careful development. The pool covers an area approximately 5½ miles long and 1½ miles wide, and has proved an area of approximately 4,140 acres. This makes an average spacing of 16 acres per well.

GENERAL GEOLOGY

The structure of the South Burbank area is a monocline dipping gently toward the south and west at a rate of about 40 feet per mile, interrupted by small folds. It is in the southwest part of an area devoid of Chattanooga shale, which covers the north-central part of the Osage area and the adjacent area in Kansas[1].

The surface rocks belong to the Elmdale and Sand Creek formations[2] of Pennsylvanian age. The surface structure has been mapped by the United States Geological Survey and published by the Department of the Interior[3].

Production is coming from a sand lens of the off-shore bar type[4] which is found within the Cherokee shale. Accumulation is controlled by the sand body pinching out into shale on the east, thus forming a trap for the oil. Some oil is being produced from the Mississippi lime.

The only unconformities of any magnitude are found at the top and base of the Mississippi lime. Little is known in the South Burbank area about pre-Pennsylvanian folding, or the amount of erosion, since few wells have been drilled to the Simpson formation and only edge wells have been drilled to the top of the Mississippi lime.

Minor folds, which are not reflected on the surface, occur in the Oswego lime. The surface folding, however, is reflected on the Oswego lime, and its axis is at nearly right angles to the folding mapped on the Oswego lime paralleling the Burbank sand ridges. This relationship will be discussed in detail under "Structure of the Oswego Lime."

TABLE 1—SUBSURFACE SECTION SHOWING KEY BEDS ONLY AT SOUTH BURBANK

PENNSYLVANIAN:
- Red Eagle limestone
- Foraker limestone
- Grayhorse limestone
- Stonebreaker limestone
- Bird Creek limestone
- Elgin sandstone
- Layton sandstone (oil showings)
- Cleveland sandstone (oil showings)
- Big lime
- Peru sandstone (oil showings) lenticular
- Oswego lime (oil showings)

In Cherokee formation:
- Pure sandstone (oil showings) lenticular
- Pink lime
- Burbank sandstone (main producing horizon)

MISSISSIPPIAN:
- Mississippi lime (some production)

ORDOVICIAN:
- Tyner formation

ORDOVICIAN AND CAMBRIAN:
- Arbuckle limestone.

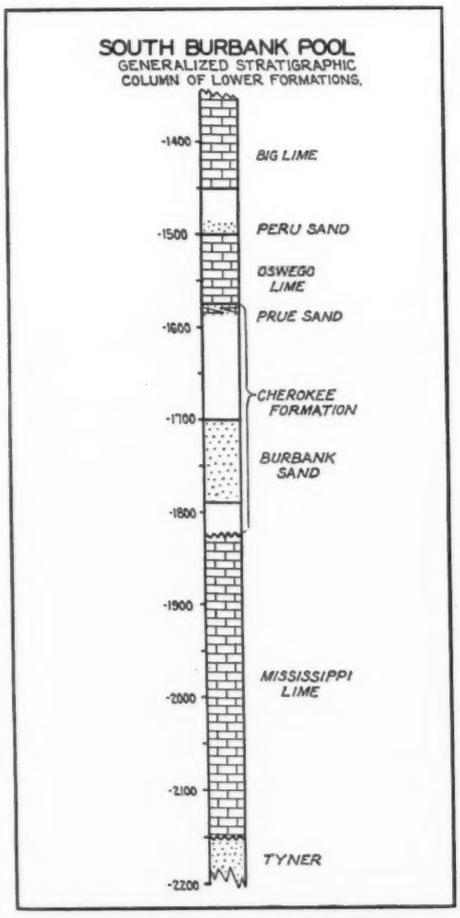


Fig. 1—Generalized section of the lower formations in the South Burbank pool

Stratigraphy of the area is not discussed in detail in this paper since it has been thoroughly covered by previous papers[2] and is essentially the same as the North Burbank pool.

The part of the section of particular interest to this paper is shown in greater detail in Figure 1 to give a better idea of the comparative thickness and relation of the various formations.

STRUCTURE

Pre-Pennsylvanian—Although only a few wells have been drilled to the Tyner formation and none to the Arbuckle limestone in the close vicinity of South Burbank, there was undoubtedly a great deal of erosion after the deposition of the Tyner and before the deposition of the Mississippi lime as evidenced by absence of the Chattanooga shale.

After the deposition of the Mississippi lime, another period of erosion peneplained the area and leveled the structures formed during the Mississippian period. There is not enough information to detail these structures, but they must have been of some magnitude, for the Mississippi lime varies in thickness from 298 to 428 feet in the South Burbank area.

Regional contours on top of the Mississippi lime indicate a flattening from east to west across the pool. Just what relation this pre-Pennsylvanian structure, or topography, has to the accumulation of the Burbank sand is not known, although it may have acted as a check on currents, causing the bars to begin forming at that locality.

A.A.P.G.—Presented before meeting in Los Angeles, March 17 to 19, 1937

PENNSYLVANIAN

Burbank Sand—During Cherokee time the entire area was again submerged and the deposition of the Cherokee formation began. In the lower part of this formation are found the Bartlesville sand in eastern Osage County and elsewhere in northeastern Oklahoma, and Burbank sand in western Osage County and adjacent areas in southern Kansas. These two sands are the principal oil-producing beds of northeastern Oklahoma.

As the Cherokee sea advanced and receded upon the land, sand bars were formed along the shores, one of which is the productive sand body in the South Burbank pool[5].

The productive part of this sand, to which the "pay" in this paper is referred, varies from a few inches to about 100 feet. The Carter Oil Co. No. 4 Oliphant, section 10-25n-6e, drilled 99 feet of pay sand and had not as yet reached the base. Nearby wells, however, had only 90-95 feet of pay and so it is estimated that 100 feet is about the maximum thickness.

The average thickness is estimated to be around 65 feet, although data in the southwest part of the pool are lacking.

It is not always true that the total amount of

*Courtesy of the American Association of Petroleum Geologists. The article is to be published in the May, 1937, bulletin of the A.A.P.G.

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pay drilled is productive. Several wells have been drilled in which shale partings were found, and in some places porosity varies from 6 to 25 per cent in the same well. This may be due to either irregular cementation or shale inclusions.

The best production may be found in any part of the pay, but the largest wells in the pool have produced from the upper few feet of sand—notably the Sinclair Prairie No. 6, Tract 140, in the SE quarter of section 9-25n-6e, which had an initial production of 5,786 bbls. and was the largest well in the field, and the Midco Oil Corp. No. 5 Adlum, NW quarter of section 10-25n-6e, which had an initial production of 5,300 bbls.

It is noteworthy that neither of these wells had any appreciable amount of sandy shale above the pay.

A few porosity tests of the sand have been made, but not enough to give an accurate estimate of the average porosity of the sand in the pool. In five such tests, porosity varied from 14 per cent to 25.8 per cent. It is estimated from these tests and from the cuttings that a fair average would be about 17 per cent for the productive part of the sand.

Growth ridges[7] which were well developed during deposition of the sand body have been fairly well preserved; and in spite of widely varying sand conditions, the areas of high initial production are known to follow these ridges. Since these ridges are not only structurally higher than adjacent areas, but are also areas of thicker pay sand, it is questionable which is the more important feature. It is the writers' opinion that thickness is probably the more important. A similar condition exists in the Burbank pool, though not so pronounced because the ridges have not been so well preserved.

Above, and lying directly on the pay sand is a sandy shale which seems to be a distinct and later phase of deposition rather than a gradation from sand to shale. Available cores and samples show that the change from a very tight, silty, impure sand to a good porous sand generally occurs within less than 5 feet.

It appears probable that after the formation of the South Burbank sand bar, submergence carried it below the zone of effective wave action, and the lower areas on top of the bar were partly filled with sandy shale. The areas in which the pay sand is found structurally low are areas of thick sandy shale. The continued submergence, then, carried the shore farther from the bar, and the sandy shale grades into the shale above. Generally speaking, the low structural areas and the west side and south end show the greater sandy shale thickness, with the east side and the high structural areas having only a few feet. A maximum thickness of 72 feet is found in the Carter No. 3 Cook, NE of section 9-25n-6e.

An isopach map of both the Burbank pay and the sandy shale above shows the growth ridges with the steep dip where the sand pinches out toward the east and with a more gradual thinning on the west side. This is due to both sandy shale and sand pinching out on the east side, while the sandy shale compensates for the loss of pay sand on the west side. The bar shape is more pronounced on the pay thickness (Fig. 2) because of the "filling in" and compensation of the sandy shale.

Water is encountered along the west side and south end wherever sand of sufficient porosity is found. The water is not found as a plane surface, but varies from a high point of 1,760 to 1,800 feet below sea level. This condition is probably due to porosity since the wells which had water structurally low did not have oil or gas above that point.

A peculiar condition exists in this connection which has not been satisfactorily explained. On the north end and east side of the pool, wells have been drilled to 1,800 feet below sea level without encountering water. Although the lowest part of the sand is not considered to afford prolific production, yet the porosity is enough to allow water to enter. A gummy condition of the lower part of the sand has been noted in wells in which the samples were complete, and it may be possible that this condition was present before the water level was established and has acted as a barrier to its later intrusion.

A gas cap is found on the higher parts of the east ridge, but most of the gas in the pool is found in solution. The largest amount of gas found in any of the wells was estimated at 15,000,000 feet per day and was found in the Midco No. 5 Adlum, NE NW NW of section 10-25n-6e. It was at first thought that the separation of oil or gas was due to shale partings or variation in porosity, but examination of cores in several wells in the gas cap area showed that the free gas and oil were coming from sand of approximately the same porosity and with no difference in lithologic character.

Bottom-hole pressure surveys made during the early development of the pool show a high-pressure area along the east side of section 3-25n-6e, which swings toward the west in section 10 and overlies remarkably well the structure on the east ridge.

STRUCTURE OF OSWEGO LIME

The structure of the Oswego lime (Fig. 3) conforms generally to the attitude of both the top of the pay sand (see Fig. 4) and the sandy shale member above. The coincidence is particularly striking along the east ridge and in the north end, the west ridge being less pronounced because it is less well preserved or developed. Structure contours on the base of the sand (Fig. 5) show that there is no parallelism between the base of the

(Continued on Page 71)

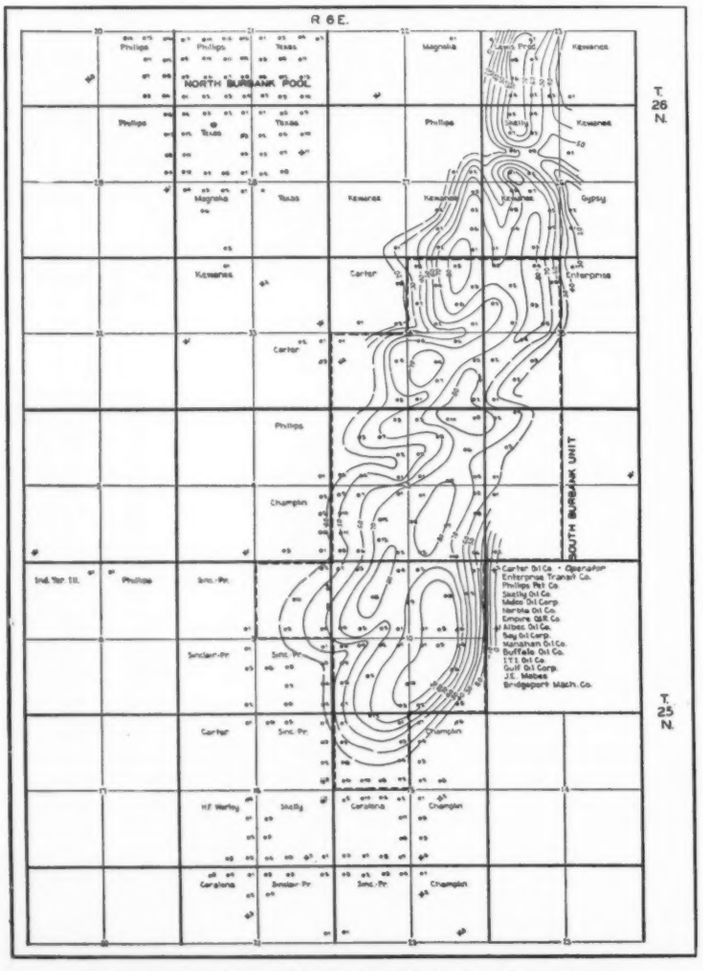

Fig. 2—Contoured on thickness of Burbank "pay." Contour intervals—10 feet

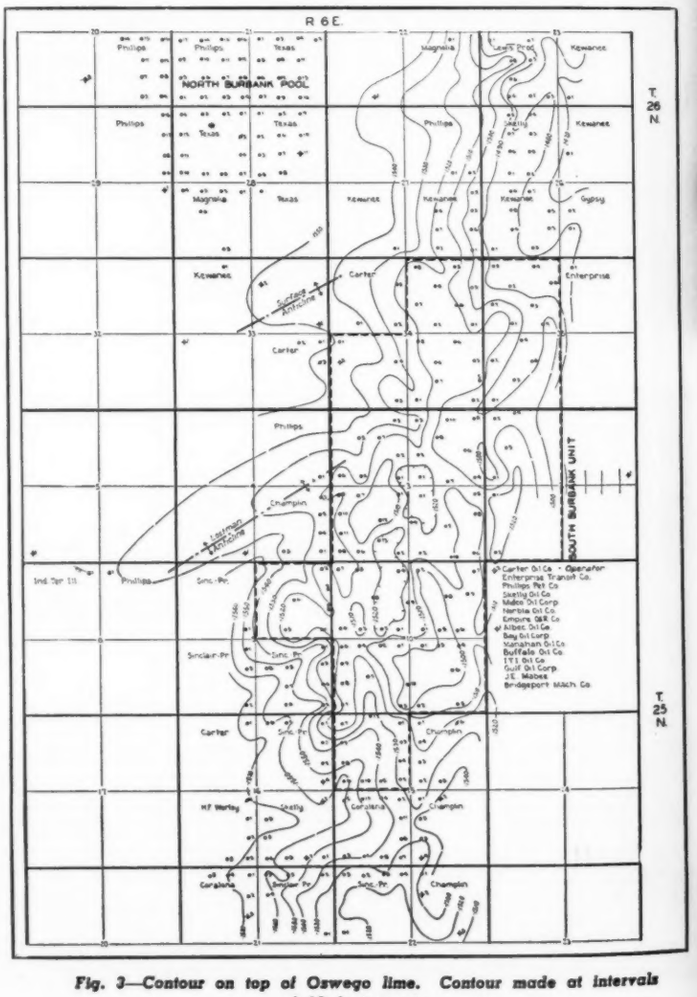

Fig. 3—Contour on top of Oswego lime. Contour made at intervals of 10 feet apart

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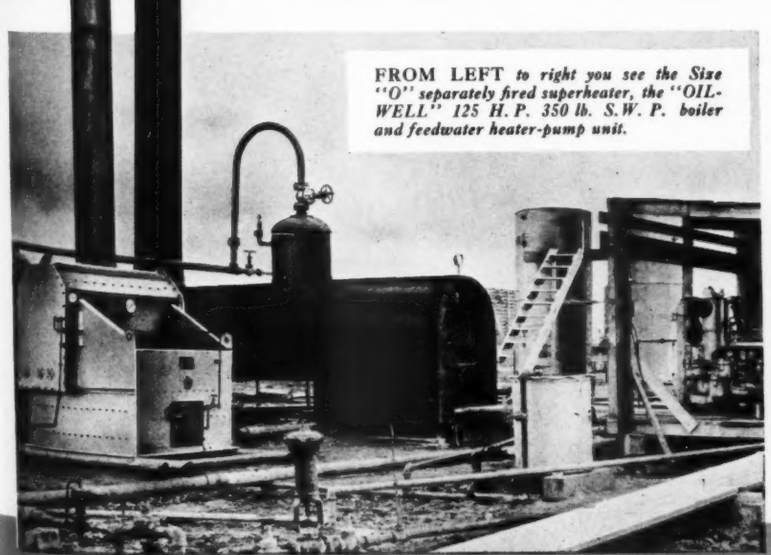

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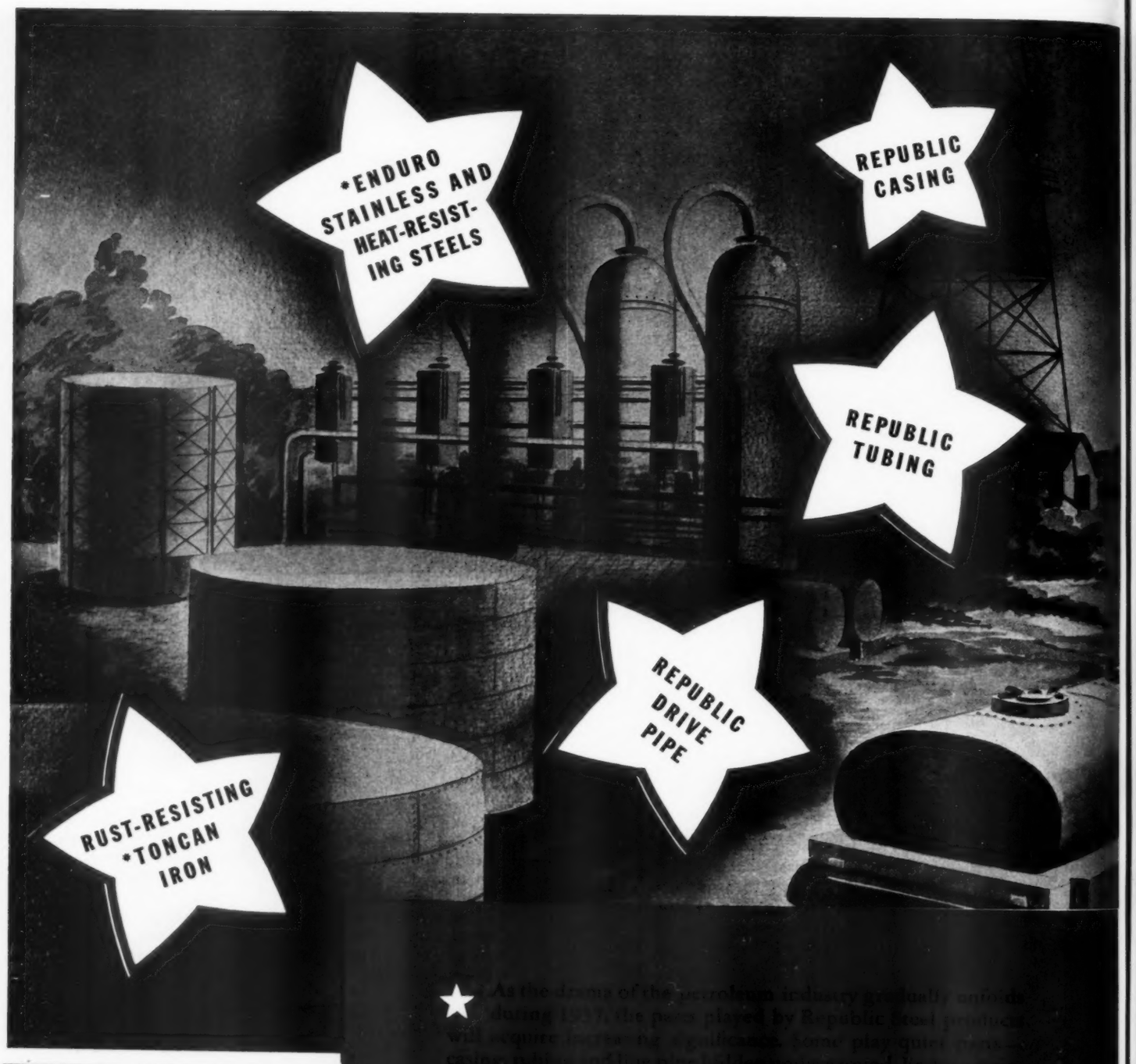

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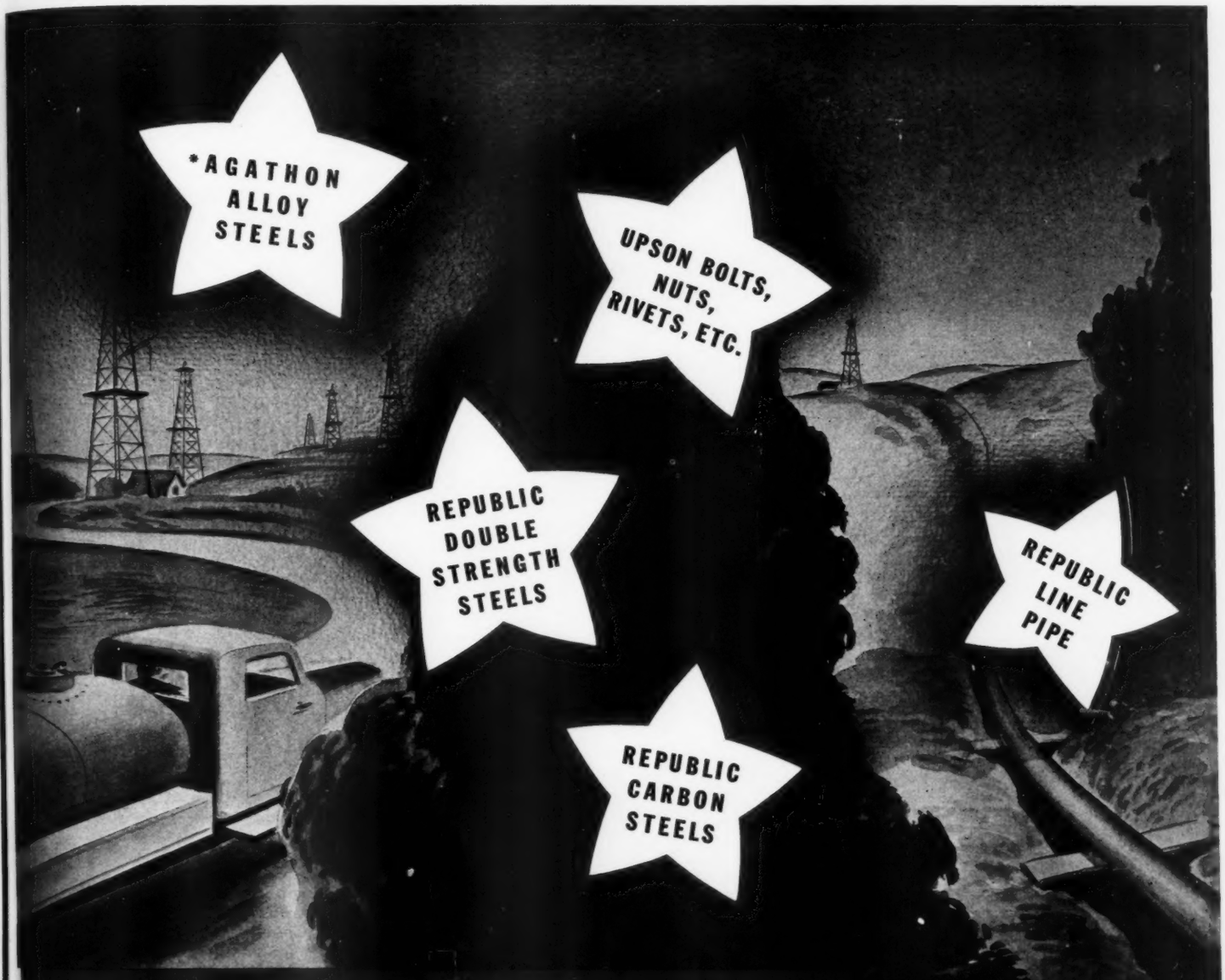

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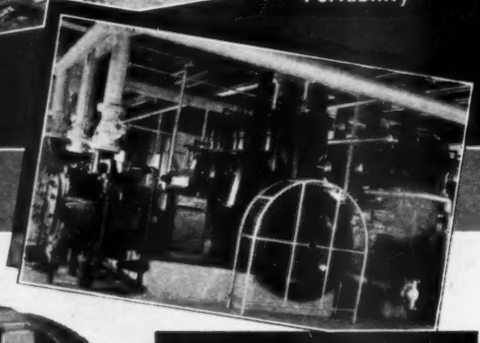

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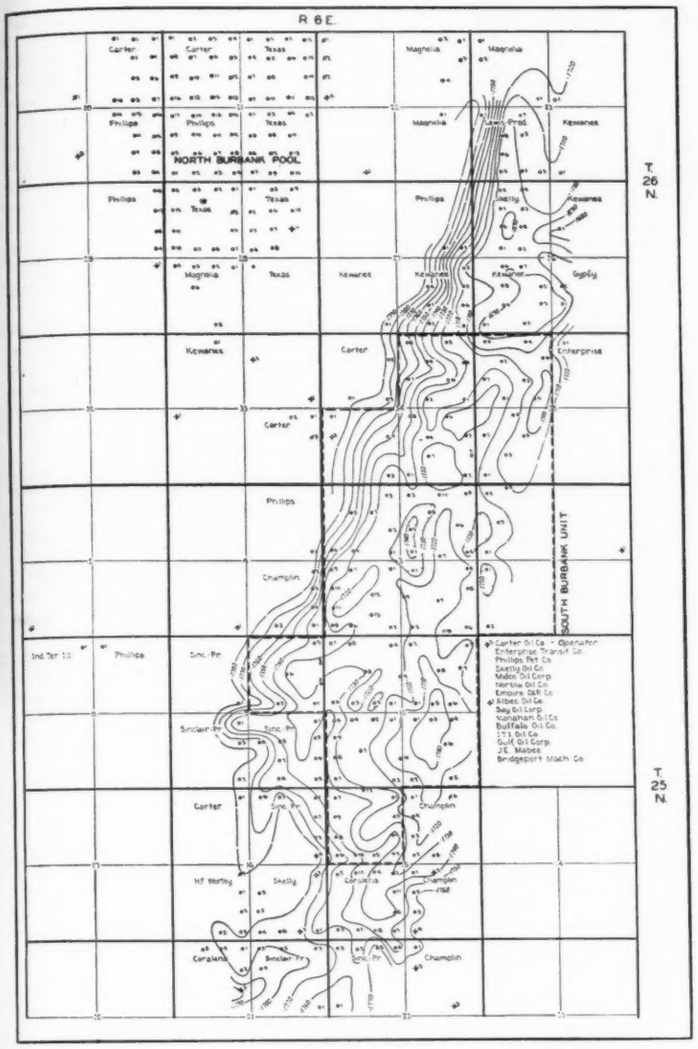


Fig. 4—Contour on top of Burbank sand "pay." Contour based upon intervals of 10 feet

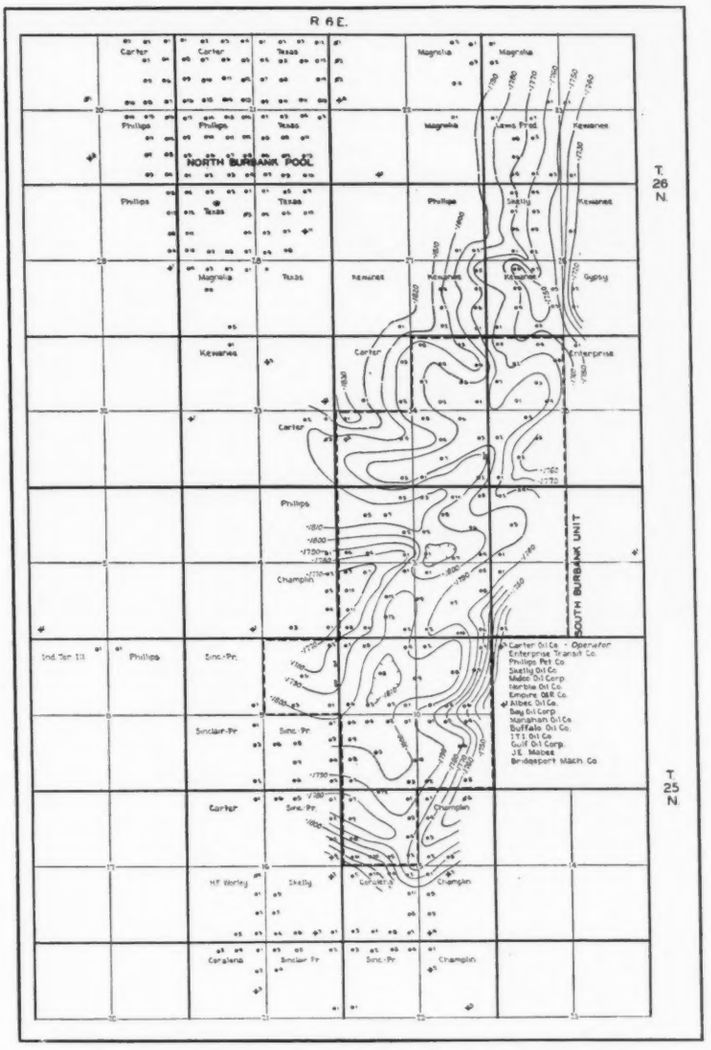


Fig. 5—Structural contour map on the base of the Burbank sand. Contour interval—10 feet

(Continued from Page 66)

sand and the top of either the sandy shale or the sand, except on the small structure in the SW quarter of section 26-26n-6e. (Figs. 5 and 6). Along the east ridge, in sections 3 and 10-25n-6e, which is the largest and best developed ridge, the base of the sand is lower under the high part of the structure than it is under the lower part farther west.

Generally speaking, the base is an irregular plane dipping at the rate of about 40 feet per mile toward the west, which is about the regional dip on the surface. It is to be expected that the base of the sand would be irregular since these bars are laid down near shore, where the shore is subjected to many currents. This may account for the high area on the base of the sand in the SW quarter of section 26-26n-6e.

Surface folding is found in the area[8], but does not reflect the structure over the ridges on top of the Oswego lime. The surface structures are, however, reflected on the Oswego lime (Fig 3), but strike at nearly right angles to the north-south ridges on top of the sand.

Compaction folds[9] as mapped on top of the Oswego lime are probably due to a combined draping effect and compaction of the Cherokee shale. Assuming that the Oswego lime was originally deposited on a nearly plane surface, the areas of thick sand would be areas of thin shale; the subsequent compaction due to loading and compression, with the loss of the free water, would be less than that over the areas where the sand was absent or thin. Athy[10] estimates that the compaction of shale under an overburden of 3,000 feet, which would be the minimum at South Burbank, would be about 40 per cent, and the compaction of sand about 5 per cent. This would easily account for the relief on the Oswego lime even after allowing 40 per cent for the thin limestones and sandstones in the upper part of the Cherokee shale.

The maximum relief on the top of the pay from the tops of the ridges to the trough is about 40 feet, while the maximum relief on top of the Oswego is about 27 feet. In general, structural relief on the Oswego is about 60 per per cent of that on the sand. On the east side

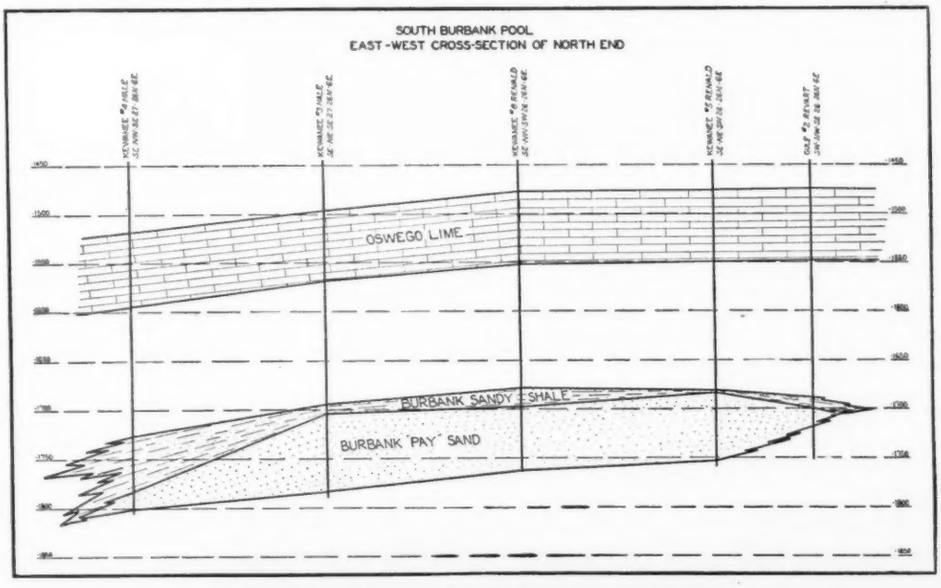
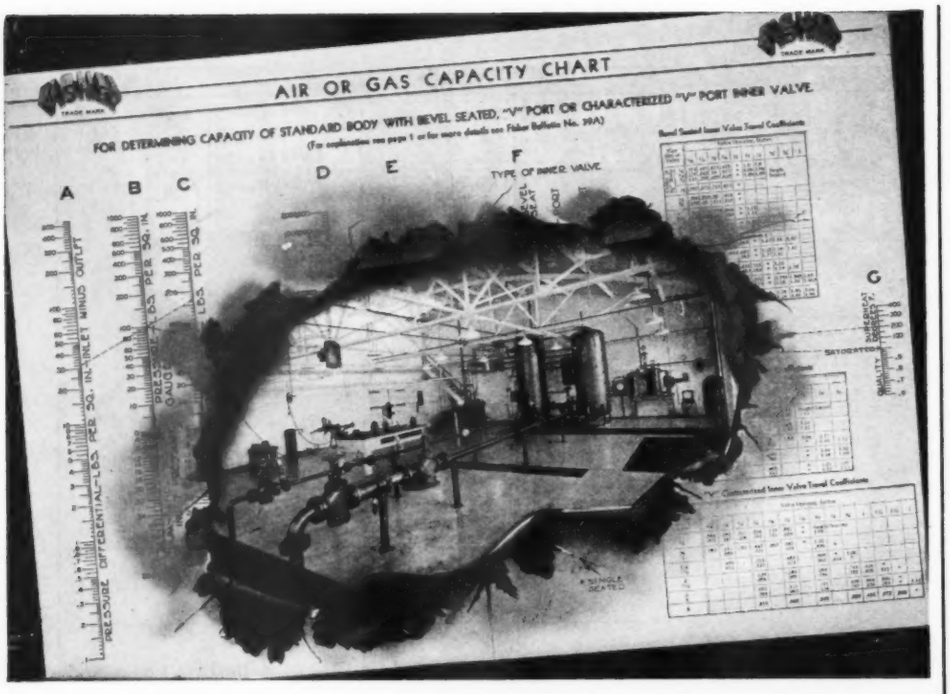
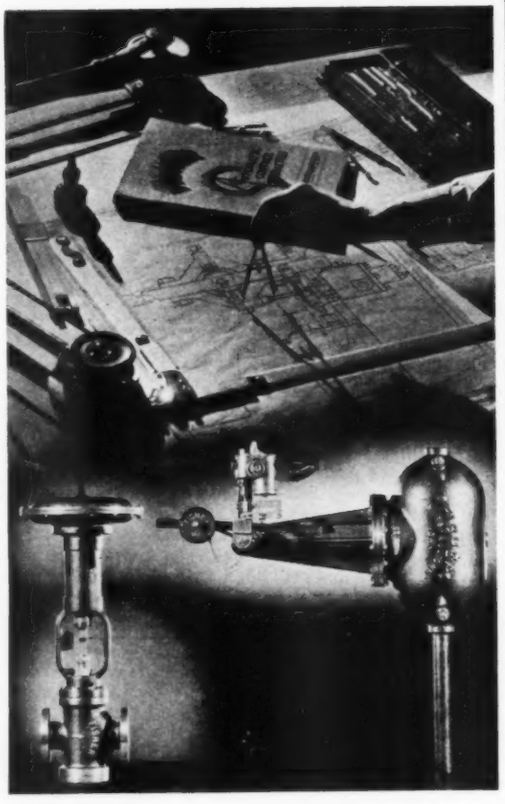


Fig. 6—East-west cross-section of the north end of the pool





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of the pool, in section 11-25n-6e, Carter Oil Co. No. 1 Barrett was drilled to the Mississippi lime without encountering the Burbank sand. The Cherokee shale in this well is thinner than the interval from the base of the Oswego to the total depth in the well farther west, which did not drill through the sand and which has an unknown amount of sand and shale between the total depth and the top of the Mississippi lime.

Several exceptions may be found in these generalizations, one of which is on Carter Oil Co. No. 3 Cook, section 9-25n-6e, which found the Oswego lime high and the pay low. However, one compensates for this thin pay section by 72 feet of sandy shale above, which is composed largely of sand. This condition would no doubt account for many irregularities; poor logging would also account for some.

The top of the Oswego lime has been used as a marker rather than the base, as it is more readily and accurately logged by the driller; and in some areas, the base has several lime stringers below it which render accurate correlation difficult even where samples are available.

RESTORATION OF BAR

To better illustrate the shape of the sand lens immediately after deposition, a map was prepared by the authors by removing the subsequent regional dip, which is about 40 feet to the mile, from the surface of the pay by mechanical methods. The correction should probably be somewhat greater because of the initial east dip during deposition, but this adequately illustrates the shape, just before deposition, of the sandy shale.

Restoring the pay to a level plane shows the sand dipping off toward the base along the east side to give the sand body the bar shape which it theoretically should have. Figure 4 shows only a flattening along most of the pool. The growth ridges are accentuated and the base is about level in the restoration.

---

[1]F. L. Aurin, G. C. Clark and E. A. Trager, "Notes on the Subsurface Pre-Pennsylvanian Stratigraphy of the North Mid-Continent Fields," Bull. Amer. Assoc. Petrol. Geol., Vol. 5, No. 2 (March-April, 1921), p. 136. G. S. Buchanan, "The Distribution and Correlation of the Mississippian of Oklahoma," Bull. Amer. Assoc. Petrol. Geol. Vol. 11, No. 12 (December, 1927), pp. 1307-20. N. W. Bass and Constance Leatherock, "Chattanooga Shale in Osage County, Oklahoma, and Adjacent Areas," Bull. Amer. Assoc. Petrol. Geol., Vol. 20, No. 1 (January, 1936), pp. 91-101.

[2]H. D. Miser (compiled by), "Geologic Map of Oklahoma," U. S. Geol. Survey (1926).

[3]C. F. Bowen, in David White and others, "Structure and Oil and Gas Resources of the Osage Reservation, Oklahoma," U. S. Geol. Survey Bull. 686-L (1922), pp. 145-47.

[4]N. W. Bass, Constance Leatherock, W. R. Dillard, and L. E. Kennedy, "Origin and Distribution of Bartlesville and Burbank Shoestring Oil Sands in Parts of Oklahoma and Kansas," Bull. Amer. Petrol. Geol., Vol. 21, No. 1 (January, 1937), pp. 30-36.

[5]C. F. Bowen, in David White and others, op. cit., pp. 137-42, Pl. 21. H. T. Beckwith, "Oil and Gas in Oklahoma; Geology of Osage County," Oklahoma Geol. Survey Bull. 40-T (February, 1928). N. W. Bass, L. E. Kennedy, W. R. Dillard, and Constance Leatherock, "Subsurface Geology of Osage County, Oklahoma," U. S. Dept. Interior Press Rept. 105368 (Jan., 1936), pp. 4-49, Pl. 1.

[6]N. W. Bass, Constance Leatherock, W. R. Dillard and L. E. Kennedy, op. cit., p. 55.

[7]N. W. Bass, W. R. Dillard, L. E. Kennedy, and Constance Leatherock, "Origin and Distribution of Bartlesville and Burbank Shoestring Oil Sands in Parts of Oklahoma and Kansas," op. cit., pp. 44-45.

[8]C. F. Bowen, in David White and others, op. cit., pp. 137-42, Pl. 21.

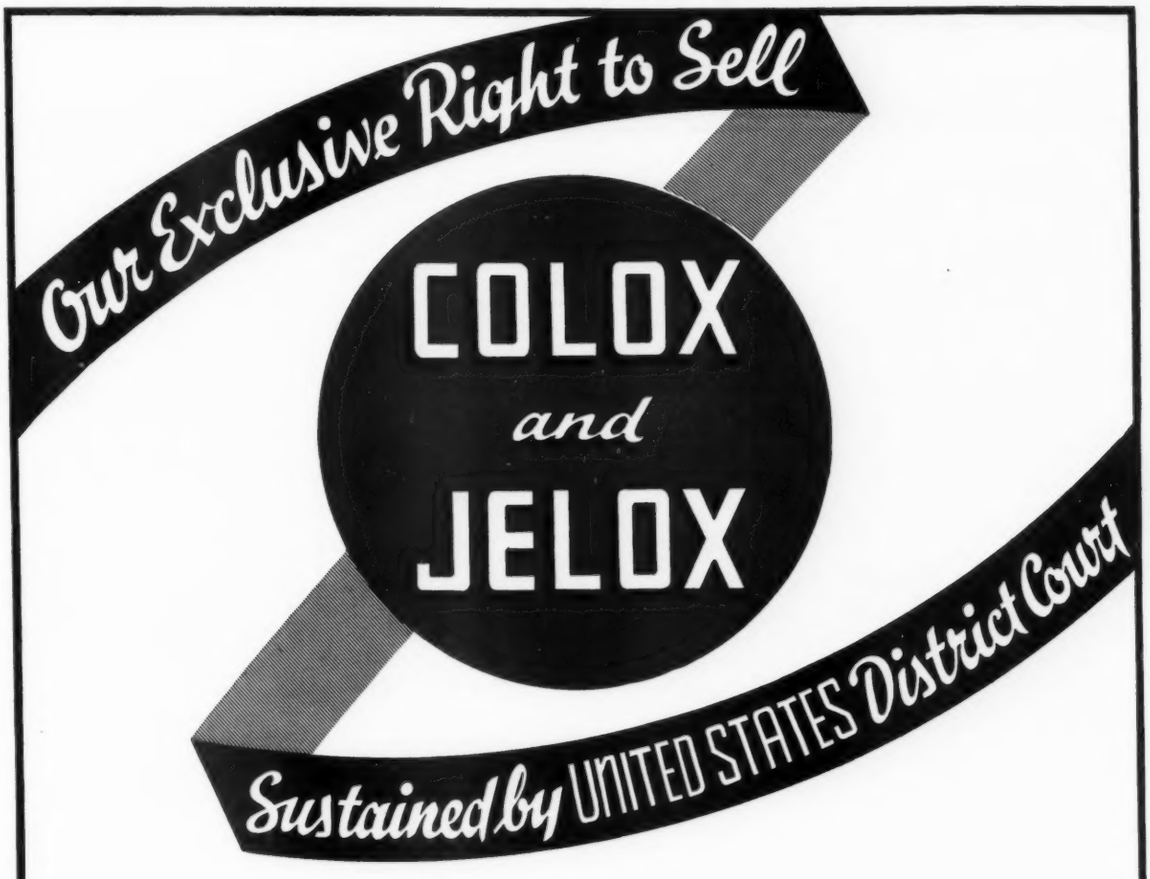
[9]H. D. Hedberg, "The Effect of Gravitational Compaction on the Structure of Sedimentary Rocks," Bull. Amer. Assoc. Petrol. Geol., Vol. 10, No. 11 (November, 1926), p. 1063. Discussion, Vol. 11, No. 8 (August, 1927) pp. 875-86. P. D. Trask, "Compaction of Sediments," Bull. Amer. Assoc. Petrol. Geol., Vol. 15, No. 3 (March, 1931), pp. 271-76. H. A. Ley, "Natural Gas in Eastern Kansas," Geology of Natural Gas (Symposium, Amer. Assoc. Petrol. Geol., 1935).

[10]L. F. Athy, "Density, Porosity, and Compaction of Sedimentary Rocks," Bull. Amer. Assoc. Petrol. Geol. Vol. 14, No. 1 (January, 1930), p. 15.

Purchasing Agents to Meet

Plans are beginning to take shape for an elaborate program to feature the twenty-second annual international convention of the National Association of Purchasing Agents which is to be held in the William Penn Hotel at Pittsburgh, Pa., on May 24 through May 27. Between 1,200 and 1,400 members are expected to attend this convention which will open with an "Early Birds" dinner on Sunday evening, May 23, in the William Penn.

Some of the country's outstanding leaders will be brought to Pittsburgh to address sessions of the convention, Thomas D. Jolly, chairman of the program committee for the convention and also president of the Pittsburgh unit of the Aluminum Co. of America, has reported.



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PROBLEMS FROM READERS

Edited by L. G. E. Bignell

Estimating Oil Reserves

I note references to the estimated oil reserves in this country from time to time and have been wondering how these estimates are made and if any standard methods of procedure have been developed. Can you refer me to any articles on the subject?—E. O. S.

From time to time very interesting articles have been prepared on the subject of estimation of petroleum reserves and one group has been published in the 1936 Transactions of the Petroleum Division of the A.I.M.E. These papers are all interesting and instructive and two of them deal with the problem as applied to specific type fields while the other three are general.

From a paper by M. Albertson, research engineer for the Shell Petroleum Co., Houston, Tex., the following is quoted:

"We must find the quickest possible accurate determination of the recovery factor. Efforts directed to this end are being made and may prove of material assistance even if no complete integrating step is found possible. Judging from past improvements along this line of endeavor we may expect to see the future yield the answer at a much earlier date than expected at present.

"Since quantity of oil recovered is a summation of the quantities due to each factor that influences recovery, under the existing conditions, an effort has been made to list all factors. The list is first made by groups:

"A. Quantity of oil in the productive formation.
"B. Energy available to move oil to the wells.
"C. Loss of energy other than in movement of oil.
"D. Efficiency with which energy is consumed in movement of oil.
"E. Loss of oil and gas due to leakage from the reservoir.

"Each of these groups of factors may be elaborated as follows:

"A. Quantity of oil in the productive formation depends on:
  "1. Volume of the reservoir rock.
  "2. Porosity.
  "3. Saturation.
"B. Energy available to move oil to the wells:
  "1. Energy of gas, oil and water, due to pressure.
    "a. Without expansion.
    "b. By expansion of each fluid.
  "2. Energy of gravity acting directly.
  "3. Molecular energy of gas, oil and water, to displace oil from reservoir rock.
  "4. Artificially supplied energy.
"C. Loss of energy other than in moving oil to the wells:
  "1. Escape of gas, oil and water pressure without oil recovery.
  "2. Gravity may move oil from the wells as to them.
  "3. Escape of gas and water without exerting their molecular energy to move oil.
  "4. Energy made unavailable due to loss of heat in reservoir, by solution reactions and changes of state.
"D. Efficiency with which energy is consumed in movement of oil:
  "1. Well spacing.
  "2. Rate of oil recovery.
  "3. Permeability of sand (shooting, acid treatment, mudding).
  "4. Gas-oil ratio.
  "5. Water-oil ratio.
  "6. Locus of gas, water and oil expansion.
  "7. Viscosity of oil.
  "8. Specific heat and latent heat.
  "9. Molecular energy.
"E. Loss of oil and gas due to leakage:
  "1. Poor quality of casing.
  "2. Normal corrosion of casing.
  "3. Improper casing methods.
  "4. Entrance of surface water.

"Although the factors may be arranged in five groups, the total number of factors is large. Enumeration of the factors and their classification into groups of factors is sufficient to suggest strongly that if accurate estimation of developed reserves has to await quantitative determination of all factors, it will never be possible. If this is true, hope of satisfactory estimates depends on finding the relationship between recovery and one or more groups of significant factors, which may be readily determined. Below are suggestions for exploration:

"1. Fractional part of total energy consumed per unit of recovery.

"2. Determination of oil recovery per unit retreat of oil from oil reservoir plus more accurate estimation of reservoir size and content. (Water surveys, gas surveys, electrical loggings of formations and better core recovery.)

"3. Rate of reservoir pressure decline per unit of oil recovered, and influence of rate of recovery upon total recovery.

"4. Oil recovery per A.P.I. gravity unit under reservoir conditions of temperature and pressure.

"5. Average gas-oil ratio and rate of variation per suitable time unit for life of field.

"6. Combination of the above factors pertinent to the particular field."

Deviation From Vertical

I have been trying to find a table which will give me correction factors to be applied to vertical and horizontal deflection of drilled holes. Can you quote such a table or give me reference to one?—E. A. D.

The following table is given on page 100 in Engineering Report on Oklahoma City Oil Field by H. B. Hill, E. L. Rawlins, and C. R. Boop, U. S. Bureau of Mines engineers, Report of Investigations No. 3330, January, 1937.

VERTICAL AND HORIZONTAL CORRECTION FACTORS PER 100 FEET OF HOLE BASED UPON NATURAL FUNCTIONS OF ANGLES OF DEFLECTION

A Angle of deflection, degrees	B Horizontal drift per 100 feet of hole	C Vertical depth drilled per 100 feet of hole	D Loss in vertical depth per 100 feet of hole
1	1.75	99.98	.02
2	3.49	99.94	.06
3	5.23	99.86	.14
4	6.98	99.76	.24
5	8.72	99.62	.38
6	10.45	99.45	.55
7	12.19	99.25	.75
8	13.92	99.03	.97
9	15.64	98.77	1.23
10	17.36	98.48	1.52
11	19.08	98.16	1.84
12	20.79	97.81	2.19
13	22.50	97.44	2.56
14	24.19	97.03	2.97
15	25.88	96.59	3.41

To find vertical correction for any given angle—multiply depth in hundreds of feet by figure under Column "D" opposite given angle.

Example: Depth 2,440 feet, Angle 8°:

$$\frac{2440}{100} \times .97 = 23.67 \text{ feet, vertical correction.}$$

To find horizontal drift—multiply depth in hundreds of feet by figures under Column "B" opposite given angle.

Example: Depth 3,260 feet, Angle 10°: $32.60 \times 17.36 = 565.94$ feet, horizontal drift.

Electrical Coring

We note several references in The Oil and Gas Journal about determining producing horizons by the use of an electric well log. We are not familiar with this development and would like to know whether it is possible to determine with a reasonable degree of accuracy the location of gas, oil and water with this instrument.—J. T. G.

A method of determining the electrical resistivity properties of rock strata penetrated by a well, developed by C. and M. Schlumberger and associates has found use in many fields. By this method a continuous record is secured throughout the full depth of a well of variations in resistivity which, when correlated with a graphic log of the formations arranged in depth sequence, gives what has been called an "electric log" of the well.

Rock resistivity is the inverse of electrical conductivity. It is measured by lowering three nonpolarizing electrodes suspended on a three-wire insulated cable, to different depths in an uncased hole full of mud fluid, developing a flow of direct current from the lowermost electrode into the wall rock opposite and measuring the difference in potential between the other two electrodes with the aid of a potentiometer located on the surface. The battery furnishing current to the lowermost electrode has one pole grounded near the well head.

The extent to which the formations are penetrated by the current depends to an important degree upon the saline content of the water present in the rock pores. Formations containing oil or gas and little water display very high resistivities. Suitable corrections must be applied to correct the observed potentiometer readings for variations in ground temperature. Two different parameters are recorded as a part of the electrical log: (1) the resistivity profile, and (2) the porosity profile. The latter is an expression of electrofiltration effects secured when sufficient hydrostatic head exists within the mud fluid in the well to cause movement of fluid from the well into the formation.

It will be noted this method will indicate the presence of gas, oil and water but only in a drilled hole before casing.

Torbanite as Source of Oil

I noticed a statement that torbernite gave promise of being a source of a considerable volume of oil in England. I cannot find any reference to this substance and wonder if you can tell me what it is and what relation it has to an oil supply for England?—E. T. T.

There must be something wrong with your reference for torbernite is the copper uranium phosphate ore and a probable source of the mineral uranium. It is a comparatively rare ore and can have no connection with oil.

It is probable that the substance referred to was torbanite, a form of shale which is found with cannel coal and was first observed at Torbane Hill, England, from which locality it gets its name. This substance is found in many parts of the world but always with cannel coal. It usually occurs under a bed of cannel coal and will vary in thickness and composition. Some torbanite will yield as much as 90 gallons of heavy oil of good quality per ton and can be retorted at comparatively low heat.

Torbanite has been confused with oil shale in some instances but under the microscope it shows that the matrix is carbonaceous and not argillaceous.

"THE DITCHER SURE HAS TO 'STEP ON IT'- WHEN IT'S A DRESSER-COUPLED LINE"

Faster than the ditcher itself can travel—that's how fast a Dresser-coupled line is laid! On a recent 42" line, for instance, trenching often held up a laying crew of only ten men. • With Dressers, no long lengths of trench need be kept open, nor is there any "lag" between operations. Such confinement of all the work to a small area, moreover, permits better supervision. • Best of all, this speed is with a joint whose permanent tightness and flexibility have been proved for 50 years!

Note to Reader: This is the second in a series of advertisements dramatizing one engineer's experience with his first Dresser-coupled line. For the complete story, write for Bulletin 351.

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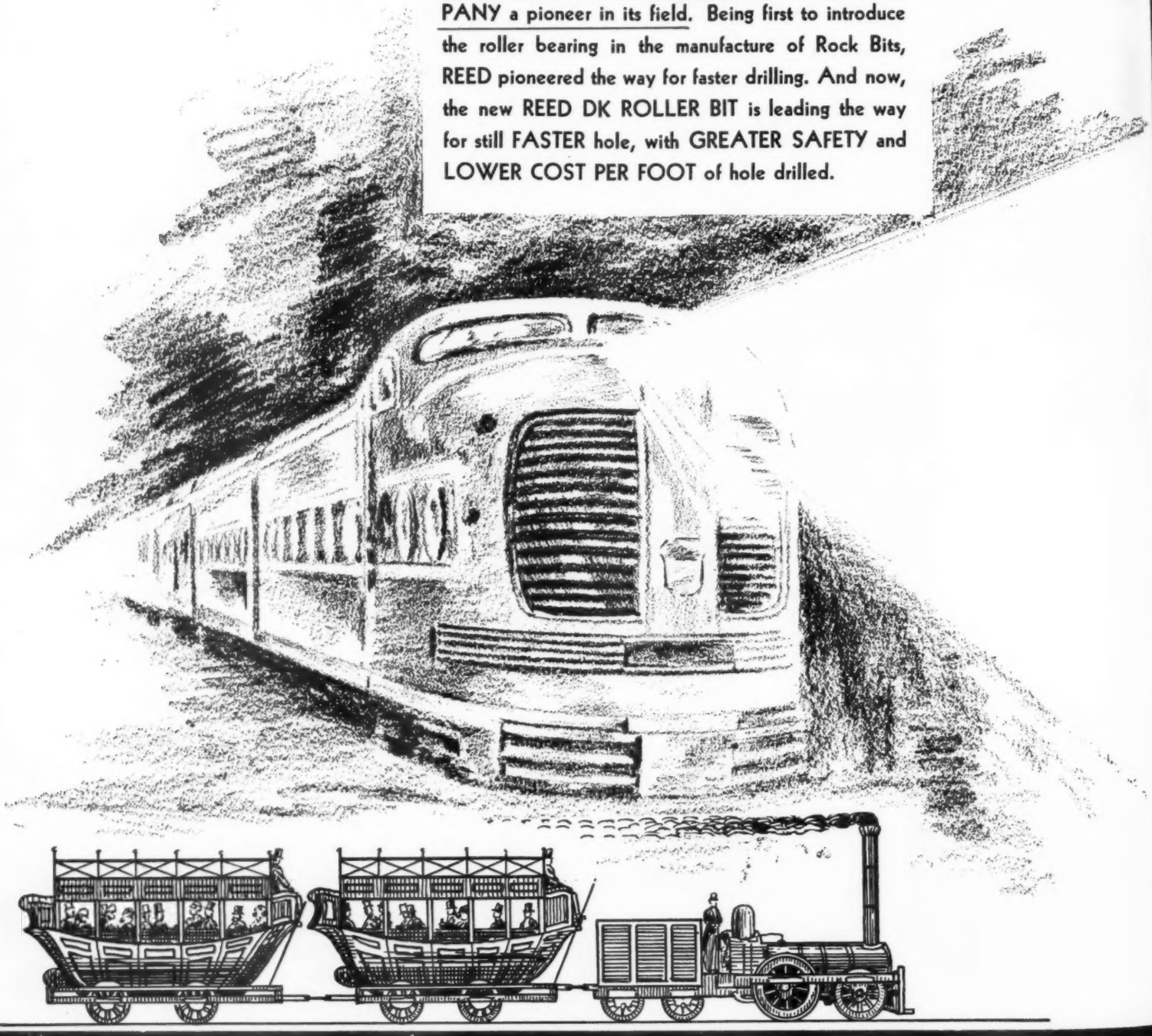
ON February 26, 1826 the New York State Legislature granted the first railroad charter in this country. In 1832, the famous "Old Ironsides" was steaming away, a pioneer for FASTER TRAVEL.

The constant demand for SPEED IN ROTARY DRILLING has found the REED ROLLER BIT COMPANY a pioneer in its field. Being first to introduce the roller bearing in the manufacture of Rock Bits, REED pioneered the way for faster drilling. And now, the new REED DK ROLLER BIT is leading the way for still FASTER hole, with GREATER SAFETY and LOWER COST PER FOOT of hole drilled.



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you lower the cost per foot on your drill pipe because

REED DK ROCK BITS

DRILL FASTER... STRAIGHTER HOLE WITH LESS WEIGHT

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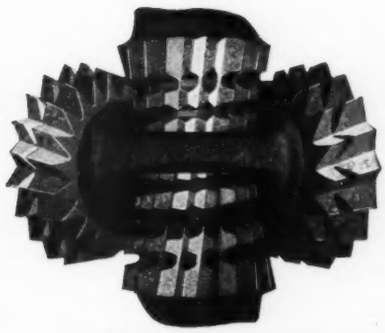
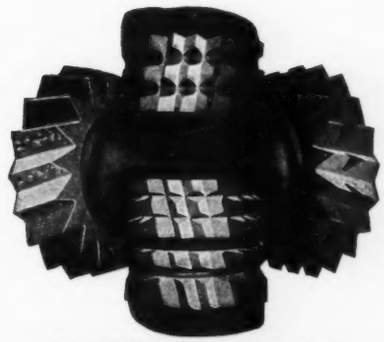
FOR BROKEN AND MEDIUM HARD FORMATIONS

DK-2



FOR HARD FORMATIONS

DK-3



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QUESTIONS ON TECHNOLOGY

By Charles K. Francis, Ph.D., Technical Editor

Copy

Methods for Controlling Corrosion of Refinery Equipment

What is considered to be the best method for the control of corrosion in straight-run and cracking stills, together with the accompanying equipment? This refers to the common run of oil, such as Mid-Continent average.—S. H.

There is no one "best method" for the control of corrosion in an oil refinery. The numerous variables may change from one refinery to another. Under average conditions it appears to be generally accepted that hydrogen sulfide is the chief corroding agent. This may be present in the crude oil and may be formed in the cracking stills. Unless the oil contains exceptional quantities of hydrogen sulfide, there is usually but little corrosion in the straightrun equipment as compared with that of the cracking unit. Most chemical reactions are hastened by increasing heat and it appears that the corrosion rate of hydrogen sulfide on iron is doubled for each increase of 25° to 30° F. The decomposition taking place in the cracking still and the high temperatures, approaching 1,000° F., are both favorable for the formation of hydrogen sulfide.

When the charging stock is corrosive it is common practice to add one-eighth to 1 pound of hydrated lime per barrel of charge. A few refiners may add more. As high as 10 pounds per barrel has been reported. The control is the quantity of hydrogen sulfide in the gas, endeavoring to maintain a maximum below 50 grains per 100 cubic feet. This treatment is said to give a protection rate of 80 to 97 per cent per year. One company reports data showing the effect of lime on corrosiveness on two stocks, a virgin stock containing 1.1 per cent total sulfur and a recycle stock containing 0.93 per cent. The virgin stock with 1.7 pounds lime per 100 gallons gave a corrosion rate of 0.62 inch per year, while the recycle stock with three-quarter pound lime per 100 gallons gave a rate of 0.016 inch.

Corrosion is being controlled to some extent by increasing the thickness of the metal; resistant metals of the alloy type; the use of protective linings; and by platings or coatings of metal. The alloys of chromium-nickel-iron are very good, especially for the tubes in the hottest zones. The 12-14 per cent chrome alloy gives good protection and it is claimed to be free from embrittlement experienced with the higher percentages; the low 4-6 per cent chromium steel with 0.5 per cent molybdenum linings give good service for equipment not subjected to direct firing. Cement is favorably reported for this purpose.

A review of the investigations, made over a period of eight years, of the causes of the corrosion of refinery equipment, and the protection methods, was reported by Arthur Marks before the seventeenth annual meeting of the American Petroleum Institute.

Sulfur, hydrogen sulfide and mercaptans are recognized as the most active corroding agents at high temperatures, 700° F. and above. However, there is no relation between total sulfur content of a crude oil and corroding power. The oils containing naphthenic acids were shown to be corrosive at 650° F. and above, but chrome steels were practically inert to these acids. Easily decomposed organic sulfur compounds are objectionable.

The protective methods for combating high-temperature corrosion include the use of the steel alloys and the addition of chemicals, neutralizers. Lime has been mentioned. Caustic soda, in the form of 15° to 25° Be. solution, at the rate of 0.09 to 0.25 pound per barrel of oil charged, is introduced in some plants.

Under conditions where there is low temperature corrosion of a chemical origin, ammonia and ammonia hydroxide give excellent protection.

References: Whitman and Roberts, Pressure Still. Corrosion Problems, The Oil and Gas Journal, December 5, 1936, page. 94. Arthur Marks, Corrosion Protection in Refineries, Proc. 17th An. Meeting A.P.I., Sec. III, 71, 1936.

Ammonia Treatment of Distillates and Fuel Oils

We are interested to know if ammonia is suitable for sweetening mineral seal oil? We are informed that some refiners are doing this.—L. H. E.

The best known use for ammonia in petroleum refining is for the neutralization of hydrochloric acid, when contained in the vapors from the stills. The ammonia being introduced ahead of the condensing coils.

Slight traces of hydrogen sulfide and acids may be removed from any distillate or residue by treating with small quantities of ammonia, then following with a water-wash. Mineral seal oil is usually not fully treated. When it does contain small quantities of acids and hydrogen sulfide, ammonia should serve very well for the proper purification. Ammonia is known to aid in maintaining the brightness and color of such products as gasoline, naphtha and kerosene during storage and when exposed to light. The further purpose for adding ammonia to stocks going to storage is to inhibit the formation of substances that cause corrosion of the tanks.

The use of ammonia is advocated for the treatment of raw distillates, such as pressure distillate, which are placed in storage for some time and then rerun. The treatment is reported to help in retaining good color, the protection of tanks and to reduce corrosion of the rerunning equipment. Some fuel oils, it is reported, are treated with anhydrous ammonia to remove traces of hydrogen sulfide. The vapors from the treated oil do not darken light colored paints or cause the tarnishing of metals, especially brass, aboard ship.

The quantity of ammonia used for light distillates and mineral seal should not be large, usually about 1 ml. per gallon to not more than 1 to 2 pounds per 1,000 bbls. in the case of a raw pressure distillate.

CHEMICALS FOR THE PETROLEUM INDUSTRY

LIQUID CAUSTIC SODA

Use: Same as the solid.

Form: Liquid, water solution.

Formula: NaOH. Aqua.

Composition—	Per cent
Sodium hydroxide	50.2
Sodium carbonate	0.3
Sodium chloride	1.0
Sodium oxide, actual	39.1

Packing: Tankcars.

A.P.I. Hydrometers For Exclusive Use of Petroleum Industry

Will you kindly tell me why gravities of crude oil are expressed as A.P.I. degrees gravity and not so many degrees Baume? Is there a table of comparative values showing the degrees Baume and the corresponding specific gravities of crude oil?—W. L.

The use of the A.P.I. scale is confined to hydrometers used only in the petroleum industry. The reason for its use has been explained in Circular 154 of the United States Bureau of Standards and the relation of A.P.I. degrees to specific gravity is explained in the same publication. A.P.I. degrees are slightly higher for the same specific gravity equivalent than the Baume degrees for liquids lighter than water, as illustrated in this table.

GRAVITY BY DIFFERENT SYSTEMS

Specific gravity—	Baume	A.P.I.
1.0000	10.0	10.0
0.9333	20.0	20.1
0.8755	29.9	30.1
0.8750	30.0	30.2
0.8240	39.9	40.2
0.8235	40.0	40.3
0.7782	49.9	50.3
0.7778	50.0	50.4
0.7372	59.9	60.4
0.7368	60.0	60.5
0.7000	70.0	70.6
0.6667	80.0	80.7
0.6364	90.0	90.8
0.6087	100.0	100.9

Complete tables for A.P.I. degrees are published in the National Standard Petroleum Oil Tables, Cir. No. 154, United States Bureau of Standards. This may be purchased for 30 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Diesel Index Number by U. S. Navy

Can you furnish the details of the method used by the U. S. Navy Department for determining the Diesel Index Number of fuel oils?—S. M. E.

Diesel index number is a calculated value related to aniline point and A.P.I. gravity. The formula is:

$$\text{Diesel Index No.} = \frac{\text{Aniline point °F} \times \text{A.P.I. gravity}}{100}$$

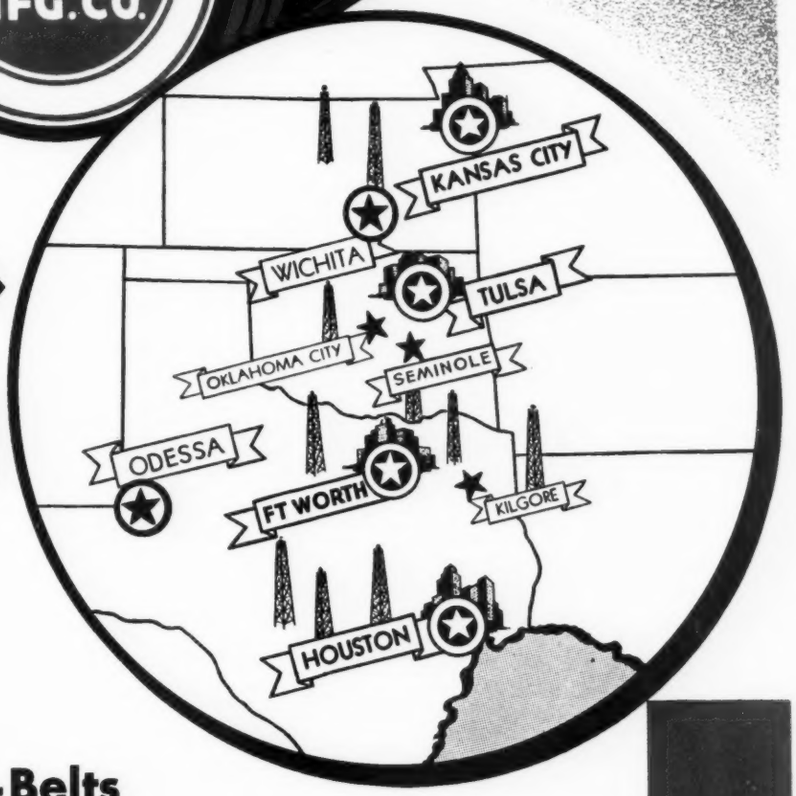
The aniline point shall be determined by the method given in Federal Specifications VV-791a, Method 310.11 F—6 x. c. This is:

"The aniline point of the petroleum naphtha shall be determined as follows: Measure 10 milliliters of the sample and 10 milliliters of aniline (freshly distilled, free from aminothiophenes) into a large test tude fitted with a stirrer and a thermometer. Heat the mixture by means of a naked flame until it becomes homogeneous, and then allow to cool until it becomes turbid. Raise the temperature slightly and make a duplicate determination. Disregard any slight initial turbidity, taking the temperature when the solution becomes completely cloudy. If the aniline point is more than 10° C. above the room temperature, use another larger test tube to form an air jacket."

Aniline point is one method for determining critical solution temperature. The paraffins have the highest, the aromatics the lowest and the naphthenes an intermediate critical solution temperature. It has been demonstrated that aromatic hydrocarbons decrease this temperature and the depression is directly proportional to the weight of aromatics present. Therefore, the Diesel Index is an indication of the composition and is commonly interpreted as reflecting the quality of paraffins.

In the

Mid-Continent & Gulf Coast Fields ⇨



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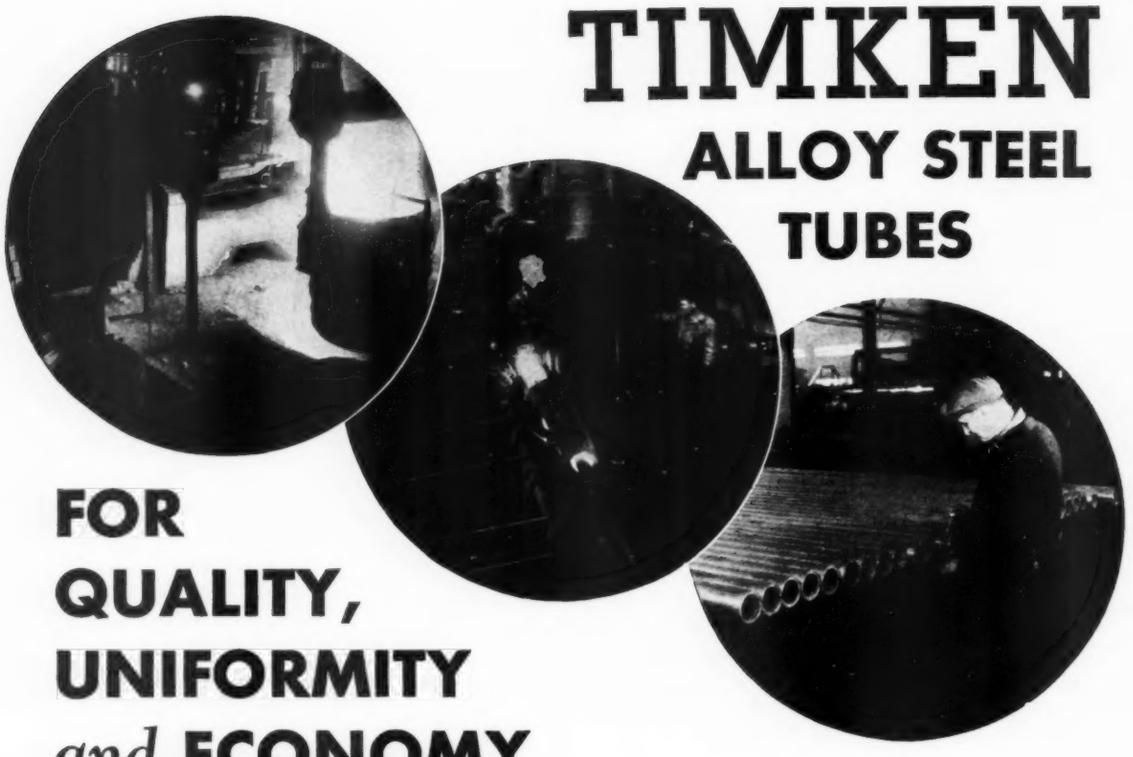
TIMKEN
ALLOY STEEL TUBES



FOR QUALITY, UNIFORMITY *and* ECONOMY

TIMKEN is the only manufacturer of alloy and carbon steel seamless tubes having complete manufacturing facilities—from raw material to finished product. Every process in the production of TIMKEN Tubes is carried out in the TIMKEN steel plant under the immediate supervision of TIMKEN metallurgical engineers.

TIMKEN manufacturing facilities include electric and open hearth furnaces, rolling mills and piercing equipment of the most modern type operating under a system of quality control so thorough and rigid that not even the slightest detail of production is overlooked.

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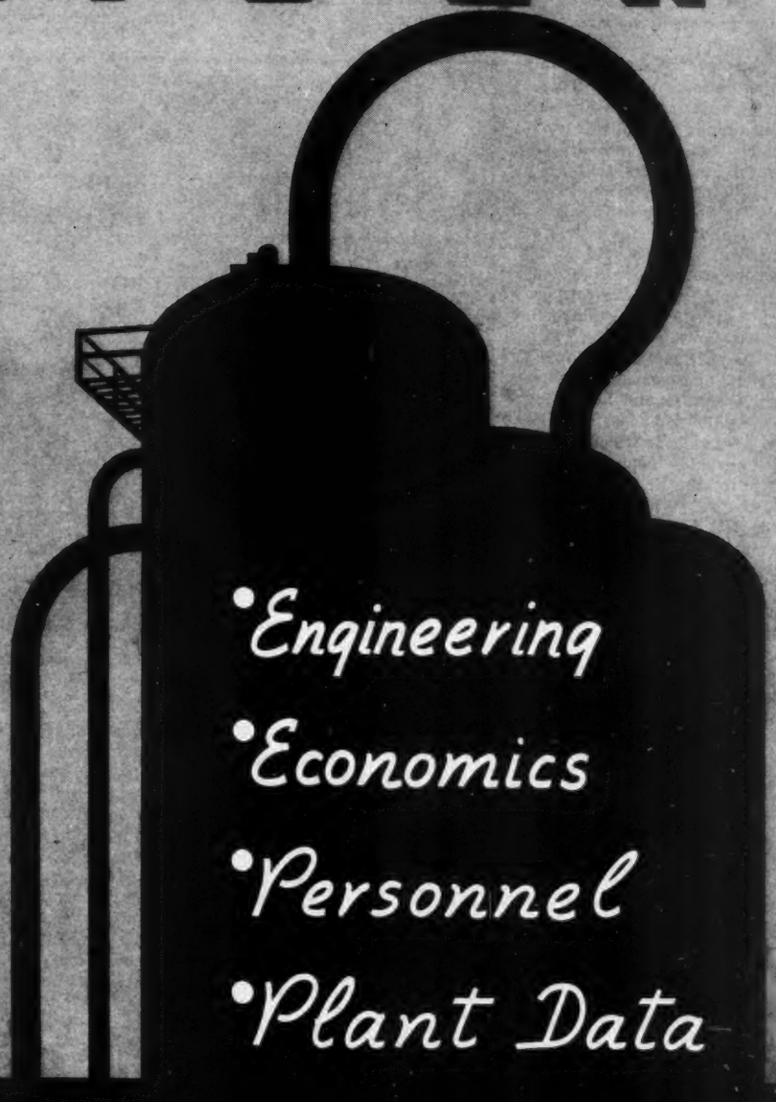
Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; and Timken Rock Bits.

TIMKEN
SEAMLESS STEEL TUBES

REFINERY ENGINEERING NUMBER



- Engineering
- Economics
- Personnel
- Plant Data

Packaging oils is becoming increasingly important

WHAT RE
NOT

By W. L. NELSON

Notwithstanding the worthy technical advancements that are accomplished each year in our industry, there are many moot questions and technical difficulties that seem to stay with us, year after year, in spite of continual agitation or study. The water-white color requirement for gasoline is a frequent source of argument. Most technical men feel that the requirement is unnecessary, that it costs the public and industry too much, and yet because of lethargy or marketing precedent, no action has been taken. The permissible sulfur content of gasoline is another unsatisfactory situation. Again technical men agree that there are different kinds of sulfur compounds, some of which are harmful and others that seem to cause little corrosion in engines. It would seem that some method of testing for corrosive sulfur compounds would be devised or some corrosion test that would serve the purpose much better than the total sulfur test now employed. Perhaps in part we are following profound and sometimes questionable studies and neglecting these small problems, that lie close at hand, the solution of which would net handsome profit to the industry as a whole.

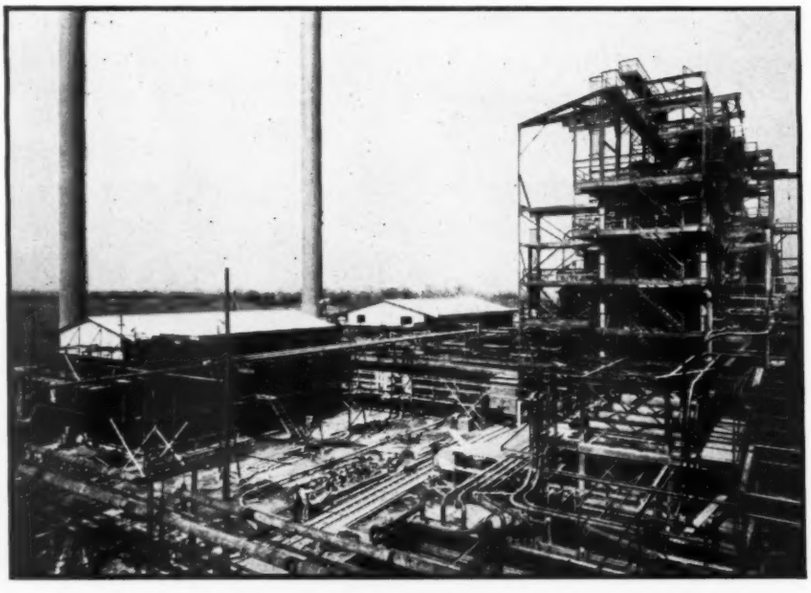
The trend of refinery practice is now definitely established toward highly technical operations and processes rather than the rule of thumb methods that for so long were thought a necessary part of petroleum refining. During the last 10 years this trend has been directed largely toward the physical phases of chemical engineering practice, such as improved methods of heating, exact fractionation, economies by heat exchange, the perfecting of continuous processes and automatic controls, whereas chemical technology now appears to be claiming the center of attention. At the same time we all realize that many of the chemical processes now in the offing are vitally dependent on the physical developments mentioned above and upon adequate construction materials, notable alloy steels. The development of polymerization technique has acted as a powerful agent in emphasizing the possibility of other chemical developments and has encouraged us to approach these further developments with confidence.

Heretofore, crude oil has been separated into commercial products mainly by the purely physical operation of distillation, and the products were accepted, such as they were, with little attempt to alter the chemical nature of the products or to reconstruct them into more suitable materials by chemical means. In fact, only one such process, namely "cracking," has been extensively used. However, the recent interest in the polymerization of cracked gases, in the separation of lubricating oils into different groups of hydrocarbons by solvent extraction and the reviving interest in hydrogenation, all fortell that we are approaching a new field of technical achievement.

The time may be approaching when crude oil will be husbanded as a raw stock for the manufacture of other chemicals than those present in crude oil. Those chemical compounds best suited for motor fuels will be sold as such and those not suited for motor fuel will be remade into suitable ones, or possibly into entirely new compounds that are best fitted for lubrication or into compounds suitable for manufacture into acids, solvents, plastics, rubber substitutes, medicines and even a vast number of materials which now we can scarcely conceive. In the opinion of the author, such revolutionary changes are still removed from current trends, but these possibilities are mentioned because they appear to be the prevalent opinions or hopes of many technical authorities in the industry. The fact that such developments have thus far appeared in only a small way should not be minimized, for such changes are not widely heralded and as each development opens new doors of advancement the whole range of possibility widens and pyramids upon itself until suddenly the trend is clearly defined and the new industry overshadows the old.

Catalysts will probably play an important part in these developments and in fact many laboratories are devoting almost exclusive attention to the use of catalysts for aiding or controlling such chemical reactions as polymerization, depolymerization, hydrogenation, cyclization, alkylation, etc. Dr. V. N. Ipatieff, an authority on the use of catalysts, feels that development in the industry is now entering a so-called "catalytic stage." Some enthusiastic men have gone so far as to suggest that crude oil will presently be used as a source of hydrogen and carbon, which raw stocks will then be synthesized or built up by means of catalytic processes, into the most highly suitable and profitable products. Common sense cannot justify such operations in the face of contemporary economic considerations and hence only some drastic emergency such as depleted oil reserves, enormous demands, exceedingly cheap sources of power, or unbelievable scientific advancements, could bring a purely synthetic petroleum industry into the realm of possibility.

The real stumbling block to rapid advancement in both the physical and chemical development of the industry is the lack of adequate physical and chemical data and it is surprising that the notably energetic petroleum industry should have delayed so long in securing such data. In spite of our worthy achievements we must shamefully admit that we scarcely know what compounds are present in the crude oil that we speak of so wisely. And, worse, we must grope in the dark with only gross average properties of mixtures as a guide, knowing all the while that each mixture is unlike any other we have handled. No truly great progress in either the physical or chemical branches of the industry can be expected until this confusion is cleared away by painstaking fundamental study. It is true that several company laboratories, the government agencies, and the American Petroleum Institute, are conducting fundamental studies that are extremely valuable, but not extensive enough to permit rapid progress against such a complex and ramified problem as that presented by crude oil. The first major problem is to identify and prepare large samples of the typical hydrocarbons that are present in petroleum. With such



Heaters and fractionating equipment in Atlantic Refining Co.'s new 20,000-bbl. combination unit being built at Atreco, Tex.

FINERS HAVE EFFECTED

Cathod Ray testing of diesel fuels for ignition qualities. Taken in the laboratory of Standard Oil Co. of New Jersey at Bayway

materials at hand it would be relatively simple to determine physical properties such as latent heat, vapor-pressure, vapor-liquid equilibrium relationships, the pressure-volume temperature relationships at elevated temperatures and pressures, and the many chemical characteristics and thermal reactions that are so necessary in any highly technical or scientific development. A program of such magnitude is worthy of cooperative action throughout the entire industry rather than sporadic efforts by a few ambitious managements.

CURRENT DESIRES

Some of the questions most frequently discussed by refiners may be classed as hopes rather than possibilities, because we never seem to find adequate answers for them. One of these is the constant battle with acid and sulfide corrosion, particularly a combined corrosive action by both agents at the same time. Some refiners appear to have settled their particular difficulties by the use of resistant metals and neutralizing agents but others have found no alternative but to pay replacement costs. At any rate, the loss to the industry continues to exceed $100,000,000 a year or a toll of perhaps 2½ to 4 cents per barrel of crude oil. Another bothersome detail is the small amount of water and sediment that is contained in nearly all crude oils. Even the small amount of 0.1 per cent that is maintained by some pipe line companies, is thought to be responsible for considerable expense in refining. The sediment collects in tanks, lines and particularly heated vessels such as shell stills, but our present methods of separating water and sediment are not suitable for the removal of such minute quantities. Controversy over the relative merits of cracked and natural asphalts continues to attract attention. In general the state highway departments continue to favor the older natural asphalts, no conclusive reasons being given, and to foster the development of tests such as the Oliensis test for detecting cracked material. As yet, no one seems to know just how many fractionating plates are required in a heavy oil tower in order to get a particular boiling-range product. So far, the technical man has answered such queries by a long answer into which is injected a series of convincing arguments of his experiences in this plant and that plant and the number of plates used. Refiners still cherish the hope that somehow their cracking plants can produce higher octane-number gasoline. Thus far the technical man has had to reply that more vigorous cracking or reforming were the only alternates but that both involved an increase in the gas losses. Perhaps no way can be devised to avoid the gas losses, but now that polymerization is available, it is at least possible to operate the cracking plant for the desired octane-number product and handle the gas, however much, by polymerization.

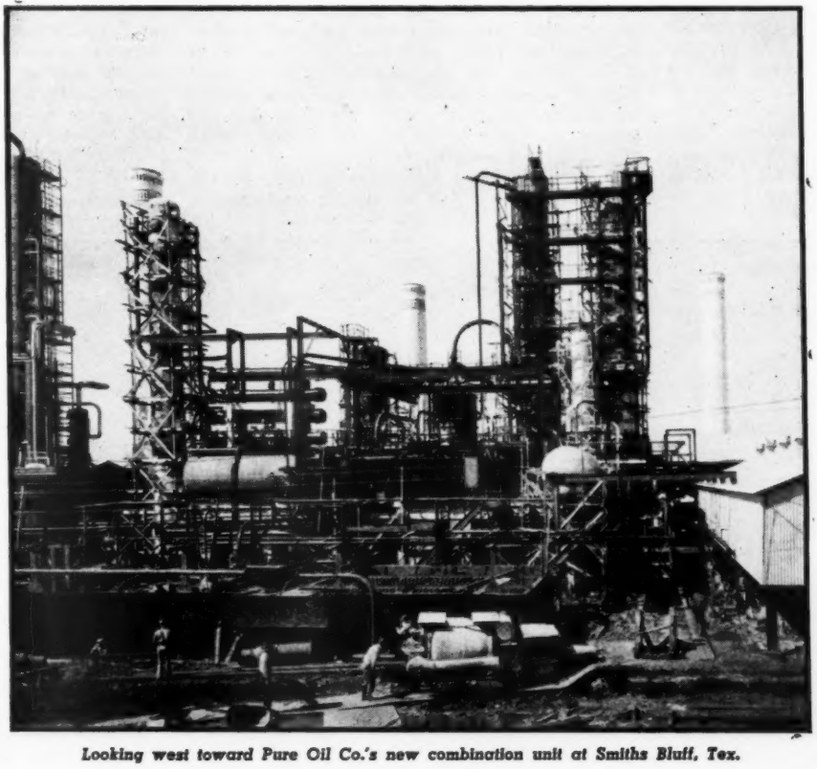
GAS POLYMERIZATION

The polymerization of cracking still gases becomes of greater importance each day. The production of polymer gasoline during 1937, as estimated by various authorities, will be between 80,000,000 and 120,000,000 gallons. The high-octane-number of this gasoline, sometimes exceeding 100, may be the answer to our problem of maintaining a suitable average octane number for our total motor fuel. However, polymerization processes have thus far been limited to a large extent to the treatment of butane and the already unsaturated gases produced during cracking. The full aim of polymerization processes is to handle the so-called dry gases such as methane and ethane which are present in such large quantities in natural gas. If all of the natural gas produced in 1936, about 2,000,000,000,000 feet, could be processed by an inexpensive and effective polymerization process, the effect on the industry and its markets would be revolutionary. An average yield of only 3 gallons per 1,000 feet of natural gas would amount to 140,000,000 bbls. of gasoline a year which is nearly a third of the present entire gasoline production including that produced by cracking.

ECONOMIC FETTERS

Further developments of many processes are held in check by present economic conditions and the cost of power. Both hydrogenation and the adoption of high-speed diesels are examples of changes that have been suppressed by economic conditions. Although hydrogenation plants have been operated for special products during the past several years, the time is not yet ripe for wholesale adoption of this exceedingly useful and flexible process. However, constant improvements in operating technique have led some authorities to feel that even slight changes in economic conditions would justify the operation of hydrogenation plants on a large scale. When hydrogenation was first practiced, the cost of hydrogenated gasoline was about 20 cents a gallon whereas now it is claimed that 10 cents would net a worthwhile profit. Should exploration fail to maintain our oil reserves, should production costs rise rapidly, or should proration fail, hydrogenation would shortly become a necessity rather than a promotion.

In the case of diesel engines the issue is not so clear. From some angles it appears that the operation of diesel engines is a profitable operation today and that the main drawback is an unwillingness to make a change that would upset so many already carefully conceived plans. Wholesale adoption of the high-speed diesel for automotive transportation would involve the installation of new motor manufacturing equipment, additional filling station facilities in the way of pumps, a reorganization of the processing methods in refineries, a readjustment of market relations between light and heavy distillate oils and of light and heavy crude oils, and a host of technical difficulties that are not now evident. It is not strange that the automotive and petroleum industries should hesitate in the face of these many complications and to beg time to consider such a move from all angles before spending large sums of money for major alterations.



Looking west toward Pure Oil Co.'s new combination unit at Smiths Bluff, Tex.

Figure 1 *Figure 2* *Figure 3*

In Figures 1 and 2 are shown metallographic structural pictures of normal, annealed low-carbon steel. In Figure 1 the magnification is 200 times, in Figure 2 it is 2,000 times. Figure 3 shows structure of steel after being heated just under the critical temperature. The magnification is 1,500 times

Structural Changes in Steel When Subjected to Heat

By R. W. MOORE

Metallurgist, Socony-Vacuum Oil Co., Inc.

Steel when subjected to subcritical temperatures (below 1,325° F.) for varying periods of time will undergo certain structural changes depending upon the time and the temperature. Certain of these changes are well known and are to be expected when the metal is heated. When steel is heated at these temperatures for extraordinarily long periods of time, as is the case in cracking tube service, certain other changes have been found to take place which are not so well known. It is the purpose of this article to point out some of these structural changes.

The metallographic structure of normal annealed low-carbon (0.15 per cent carbon) steel is shown in Figures 1 and 2. In Figure 1 will be seen the large light-colored grains of ferrite or iron, among which are interspersed the dark colored grains of pearlite or the constituent which contains the carbon. Figure 2 shows at higher magnification more of the detail of pearlite structure. It will be noted that it has a laminated appearance, the laminations being made up of alternate layers of ferrite and cementite (iron carbide Fe_3C). When such a steel is heated for a short time at some temperature just under the critical temperature of steel (1,100° to 1,200° F.) the lamellar structure of the pearlite begins to break up. The iron carbide or cementite begins to coalesce and becomes spheroidal in form. This is shown in Figure 3. As the heating continues the cementite becomes more spheroidal and has a tendency to migrate to the ferrite grain boundaries. This is shown in Figure 4.

The structural changes which have been mentioned above are those which have been well known for a long time. Chemical reactions, however, proceed as a function of time and temperature and always have a tendency to continue until the state of most stable equilibrium has been reached. In low-carbon steel a reaction of this kind, namely, the breakdown of cementite into iron and carbon, takes place.

$$Fe_3C \longrightarrow 3\ Fe + C$$

However, since conditions favoring such a reac-

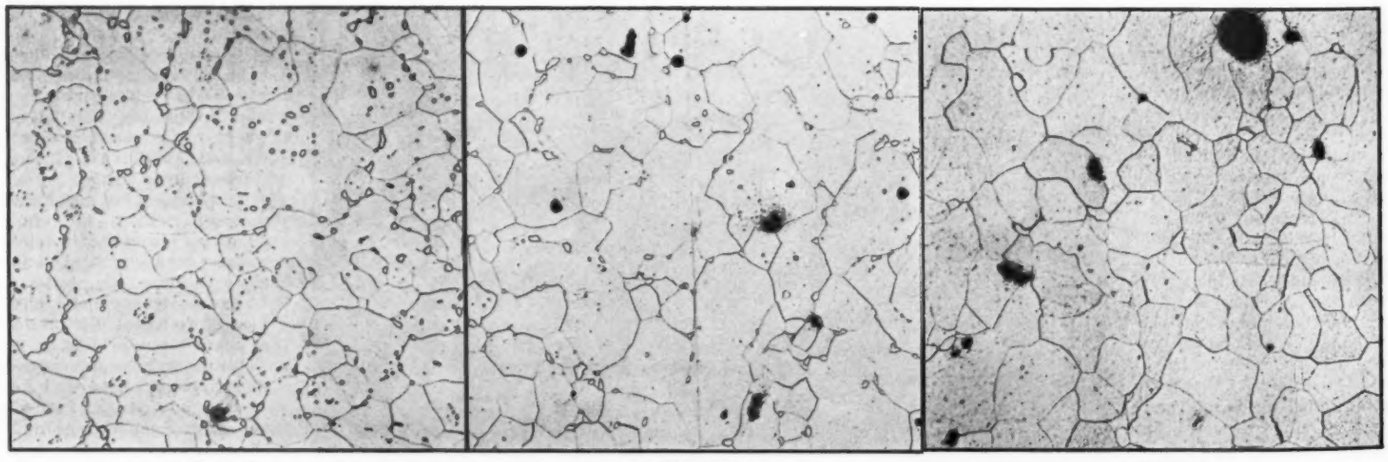


Figure 4 *Figure 5* *Figure 6*

In Figures 4 and 5 the trend in changes which take place in the progressive heating of the steel are shown. In Figure 4 magnification is 200 times, in Figure 5 is 1,500 times. Figure 6 shows metal after heated to breakdown point of iron-carbide to show nearly 100 per cent ferrite. Magnification 1,500 times

tion are rather unfavorable, a long time is required for a state of equilibrium to be reached. Figures 5 and 6 show the final steps in the changes which take place in this breakdown of the iron carbide. It will be noted in Figure 6 that the metal structure is composed almost completely of ferrite. There is a complete absence of any form of carbides. A large black pit remains which undoubtedly contained the carbon or graphite from the breakdown of the cementite.[1]

CRACKING TUBES

During the past five and one-half years low-carbon steel tubes which have failed have been removed from a deFlorez cracking still. Metallurgical examinations have been made of these tubes which have shown the above metal structures.

Figure 7 is a composite photograph of the structures of 18 of these tubes grouped around a cross-sectional diagram of the furnace to show the location of the tubes. The tubes represented in this photograph are open-hearth of the S.A.E. 1,015 type steel and have been in service for five and one-half years, the latter time representing about 45,000 hours of service. The furnace temperature was 1,450° F. The temperature of the oil going into the tubes is about 700° F. The oil temperature at the outlet is about 1,030° F. Allowing for a temperature gradient of the oil through the bank of the tubes as well as a further temperature gradient between the oil in the tubes and the furnace temperature, it would be our estimate that the probable temperature of the metal has been between 1,000 and 1,100° F. The pressure of the oil entering the tube bank is about 650 pounds per square inch. We do not know what the pressure gradient is through the tube bank. The analysis of the metal is as follows:

Carbon	0.15
Manganese	0.49
Silicon	0.02
Sulfur	0.023
Phosphorous	0.015

The physical data of the metal from these tubes is shown in Table 1.

TABLE 1—PHYSICAL DATA OF TUBES REMOVED FROM CRACKING STILL

Tube No.	Reduction of area	Elongation % in 1¾"	Yield point P.S.I.	Ultimate strength P.S.I.	Rockwell B hardness
162	76.78	48.5	26,560	41,170	29.5
163	76.76	41.7	30,410	45,150	39.2
164	78.73	51.4	30,740	40,040	27.2
165	78.73	48.5	28,880	43,820	36.6
166	78.73	50.3	29,220	42,690	34.2
167	78.73	51.4	29,080	43,290	32.4
168†	78.80	51.5*	27,400	38,800	28.0
169†	75.60	49.5*	27,900	39,500	28.0
170	78.08	52.0	24,040	40,500	29.1
171	76.76	48.5	25,230	40,700	33.0
172	76.76	48.5	23,110	40,500	37.1
173	78.73	51.4	22,510	39,840	27.7
174	79.15	52.5	29,880	43,090	29.1
175	76.76	57.1	25,170	40,440	26.3
176	76.75	47.4	29,550	45,280	38.6
177	78.08	52.0	32,400	43,030	30.1
178	78.08	54.2	26,560	39,440	26.0
179	78.08	51.4	31,070	39,370	28.0
171‡	64.15	42.8	23,200	47,810	47.7
New tube	71.44	35.4	38,980	55,980	66.0

*Elongation in 2 inches. †Diameter of test piece equals 0.346 inch with 2-inch gauge length. ‡Tube annealed.

Eleven of the tubes (numbers 162, 164, 168, 169, 170, 171, 172, 173, 175, 178 and 179) seem to show graphitized metal. Seven show the carbides still to be in the spheroidized form.

The graphitized tubes generally seem to be more ductile, softer and to have a lower tensile strength than the spheroidized, or, of course, the new tubes do. These studies have indicated that there is a general tendency for low carbon steel to reach a state of ultimate equilibrium when exposed to long soaking at the temperatures to which this metal has been subjected. The carbides (Fe_3C) break up into carbon or graphite and iron. The metal is softer, more ductile and has less strength than originally.

[1]"Graphite in Low-Carbon Steel," A. B. Kinzel and R. W. Moore, Trans. Am. Inst. Mining Met. 116, 318-29 (1935).

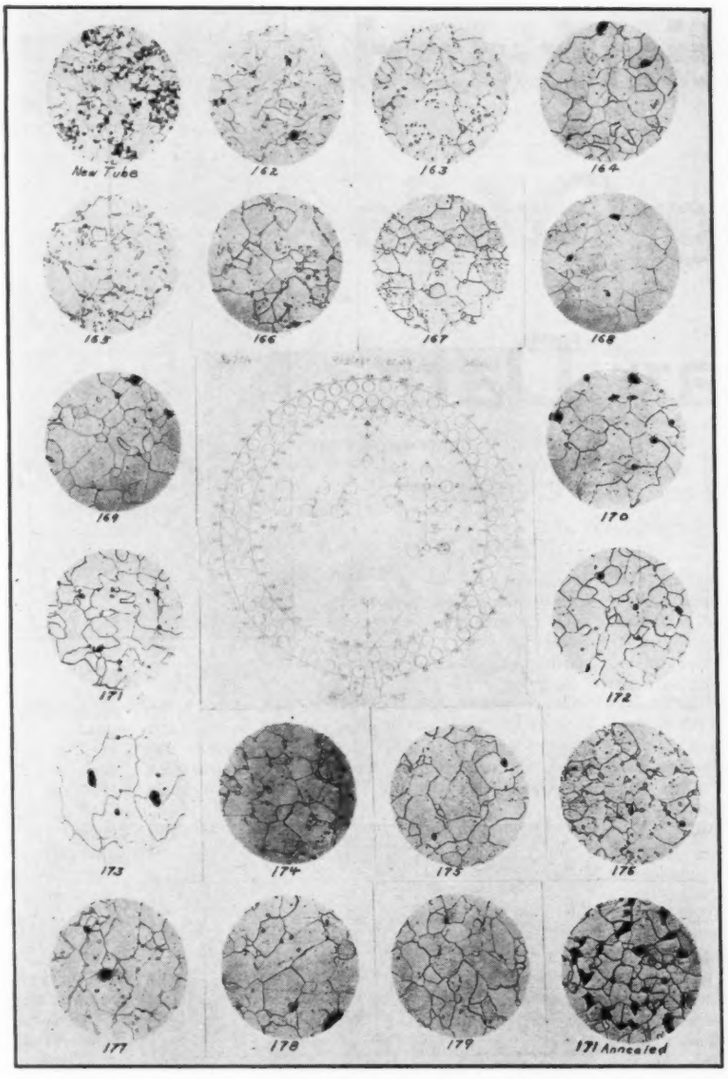
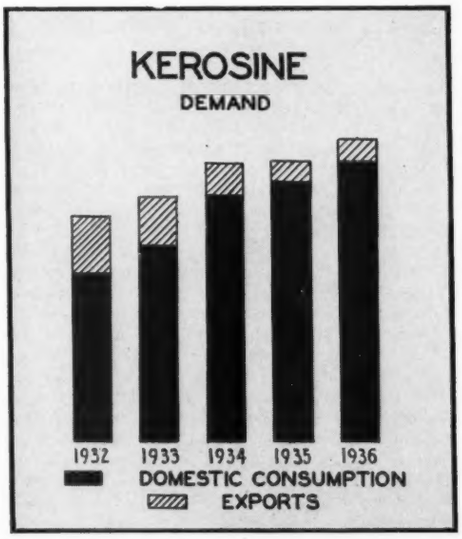


Fig. 7—Magnification 125 times



KEROSINE DEMAND U. S.—BBLS.

Year	Domestic	Exports	Total
1936	51,479,000	6,886,000	58,365,000
1935	47,645,000	6,651,000	54,296,000
1934	44,234,000	9,781,000	54,015,000
1933	38,493,000	8,959,000	47,452,000
1932	33,221,000	11,044,000	44,265,000

Weed Control

Oils are effective in controlling all types of annual weeds and preventing biennials and perennials, from seeding, according to O. K. Norman, engineer with the Bureau of Public Roads. Oils have great penetrating power and are the only herbicide that will destroy the viability of seeds. For this reason they have been widely utilized in puncture vine control. Oils are top killers and when applied as a spray do not ordinarily penetrate underground tissue. Mr. Norman said: "All oils are destructive to vegetation, but the mineral oils are the only ones cheap enough for general use. Coal-tar creosote oils sometimes sold as 'crude carbolic acid' are excellent weed killers for small areas but are too expensive for large-scale operations. The most promising of the oils tested for weed control are those least refined, such as crude oil, waste cylinder oil, slop distillate, diesel oil, and stovepipe oil. Stovepipe oil is a local name for a by-product at certain western oil refineries. The two most widely used products are diesel oil and stovepipe oil. One is probably as efficient as the other for destroying vegetative growth, but if an emulsion is desired to reduce the cost for large-scale treatments only diesel oil in commercial state will give satisfactory results.

"Usually oils are applied at the rate of 300 to 400 gallons per acre—a quantity sufficient to cover the vegetation and soil with a thin film. A spray pump providing a pressure above 80 pounds is recommended. Rubber parts of the spray outfit, readily attacked by oil, should be replaced by metal wherever possible.

"Diesel oil is an effective herbicide for destroying vegetation in ditches, or similar locations.

"A few authorities recommend diesel oil as a selective spray for controlling crab grass in lawns. The danger of injuring the bluegrass is, however, very great even under favorable conditions.

"Heavy applications of oil on roads and railroads act in the dual capacity of weed killers and dust layers. The amount required when acting as a weed killer alone is obviously much less than that needed as a dust preventative unless permanent sterilization is desired.

"A great many state highway departments eradicate weeds with oil as an incident in stabilizing or preventing dust on shoulders and roadway surfaces. California probably exceeds all other states in its use for the sole purpose of weed eradication for fire protection. Since 1929 oil applications have been a regular part of the highway commission's maintenance program with an annual expenditure of about $80,000 on about 1,100 miles of the state highway system. The roadsides are sprayed and burned to provide a firebreak between the highway and adjoining property as well as to prevent erosion damage by protecting the natural cover from uncontrolled fires. Generally no spraying is done opposite locations where an effective natural or artificial firebreak exists adjacent to or within a reasonable distance of the right of way."

Correlating and Showing Crude Oil Assay Data

By SMITH D. TURNER and FRED C. CANANT
Humble Oil & Refining Co.

A technique of correlating the inspection data obtained on cuts from crude assays has been developed which, it is believed, will enable the data to be presented more concisely, and more information to be made available from a given amount of laboratory work, than is possible by means generally in use. The proposed method is presented herein, together with inspection data on East Texas crude fractions which serve to illustrate the method, and which are felt to be of value per se.

The information desired from crude work-ups is a knowledge of the inspections of well fractionated cuts of various widths, and from various positions in the crude. If the crude is considered as cut at only the 10 per cent points, 55 cuts are possible (such as a 0-20 per cent naphtha cut, a 50-60 per cent gas oil cut, or a 70-100 per cent residuum cut). If the division is considered possible at the 2 per cent points, there are 1,275 cuts. Thus to present full information on the inspections of only the cuts which can be prepared practicably in the laboratory would be a nearly impossible task. Because of this, information is usually presented on only a few cuts typical of those taken in the plant, or on narrow-boiling fractionations from which it is possible to calculate, often with poor accuracy, the inspections on wider cuts lying at various positions in the crude. Frequently the information obtained by both of these methods is insufficient to answer all questions arising in the consideration of new operations.

The method proposed herein allows the presentation of complete inspection data on all possible cuts of any width or position in the crude. A plot is made, taking the per cents corresponding to the light or front cut points of fractions as abscissae, and the per cents corresponding to the heavy ends as ordinates, and then isometrics are drawn representing any desired tests or properties.

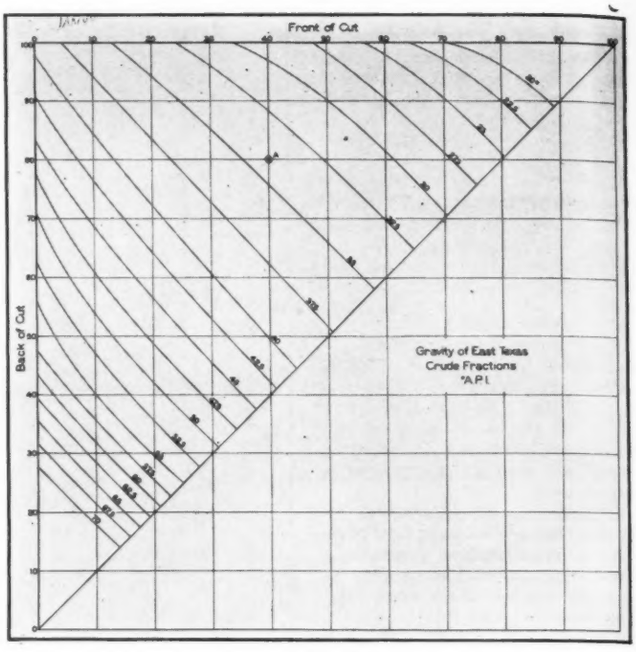


Figure 1

The method can best be understood by reference to Figure 1, which presents data on the gravities of cuts from East Texas crude. Here, the point "A" represents a wide gas oil cut distilling between 40 per cent and 80 per cent on the crude.

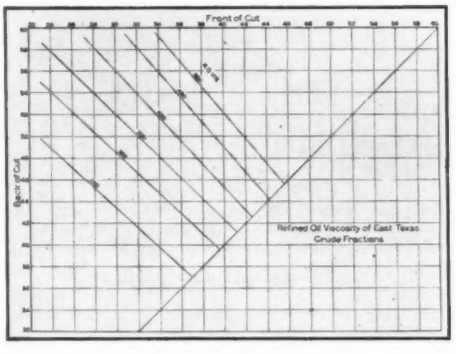


Figure 4

The lines representing constant gravity have been drawn and these indicate that the gravity of the 40-80 per cent cut is about 34° A.P.I. Points lying along the left-hand boundary of the diagram all represent cuts of which the light end lies at 0 per cent on the crude—that is, cuts of various lengths but all containing the lighest fractions. For further illustration, the 0-40 per cent wide naphtha cut is shown to have a gravity of about 62° A.P.I. Points lying along the top boundary of the diagram similarly represent crude residua of various lengths—the 70-100 per cent cut, or 30 per cent bottoms, is shown to have a gravity of 20° A.P.I. Points lying along the diagonal boundary of the diagram represent narrow cuts of infinitesimal width; thus the differential amount coming overhead at the 40 per cent point on the crude distillation is shown to have a gravity of about 43° A.P.I. The upper left corner of the diagram of course represents the whole crude, and shows a gravity of 39° A.P.I.

The method can, of course, be used to show properties other than gravity. It will be common sense to draw isometrics for any property only in the range where it is of interest; Reid vapor pressures would be confined to the gasoline range and not extended into the range corresponding to middle distillates and fuel oil. Gravity, as shown in Figure 1, is desirable information on fractions throughout the whole crude. For showing the other properties, two alternatives are available; a chart of considerable size might be prepared showing the tests of interest on each class of products in the area of the chart covering such problems, or portions of the chart corresponding to each class of products may be drawn on a large scale showing only the isometrics of the tests of interest in the range. We have found it preferable to put all the information concerning a single test on a single chart, because several tests plotted on a single chart made for confusion, and the plotting of a chart for each class of products (such as one for light naphtha, one for kerosene, one for middle distillates, and one for residua) would make it necessary to consult several charts for the complete information on one property such as gravity.

As further illustration of the possibilities of the method, and because of the value of the data in this convenient form, Figure 2 showing aniline points of cuts in the middle distillate and heavy gas oil range, Figure 3 showing A.S.T.M. F.B.P.'s of cuts boiling up to 700° F., Figure 4 showing refined oil viscosities in a wide kerosene range, and Figure 5 showing octane numbers in the naphtha range, have been prepared.

Construction of these diagrams is not difficult even with a limited amount of data available. This is particularly true of diagrams covering limited ranges, since, on these, the curves tend to be straight and parallel. In such cases, with at least two points along each of two or three lines to establish the slope of the family of curves, and one

(Continued on Page 140)

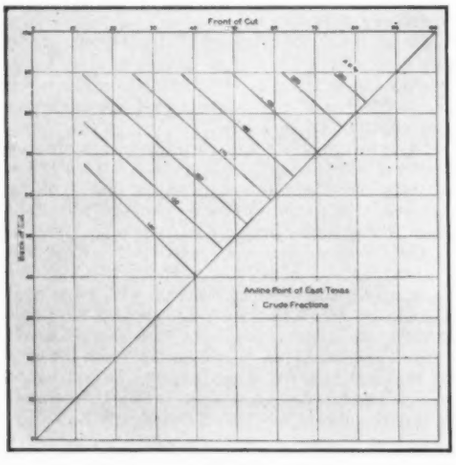


Figure 2

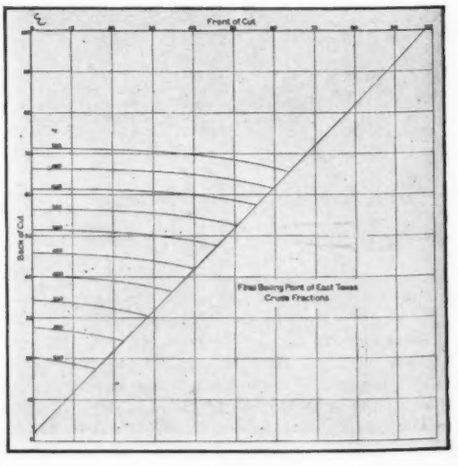


Figure 3

Solvent Refining Is Furnishing Large Share of Motor Oils

By DR. C. K. FRANCIS

The problem of how to make a kerosene of good quality, especially with less tendency to smoke when burned in a lamp, than could be produced by the conventional methods, was solved many years ago when Lazar Edeleanu invented the liquid sulfur dioxide process for the purification of kerosene obtained from a Rumanian oil. The process was described in British Patent 11,140 issued May 22, 1908. Later additional patents were obtained describing the application of sulfur dioxide for treatment of lubricating stocks; the first plant went into operation in 1927 at the Associated Oil Co. refinery in California.

The internal combustion engine was improved so rapidly for automobile use intensive study of the lubricating oil became necessary. The oil should change in viscosity but little with variation in temperature, meaning a high viscosity index is required; there should be no tendency to deposit large quantities of carbon; the oil should not form a sludge and should flow at low temperatures. In 1930 it would have been difficult to procure any large quantity of oil meeting specifications of this sort; however, during the past seven years numerous solvent refining units have been constructed and put into operation, so now ample supplies of this kind of lubricating oil are available.

Some types of crude oils were known to yield lubricating oils, when refined by the ordinary method, which had a tendency to form carbon in the cylinders and contained large quantities of wax, making it difficult and expensive to produce low pourpoint oils. Other types furnished lubricating oils having low pourpoints, but they showed low stability and rapid drops in viscosity with elevation of temperature. Recognizing that these properties, and others, could not be corrected by simple treatment it was necessary to turn to those chemical reagents which would dissolve selectively those constituents of the oil that were the cause of these objectionable features. The several processes now available make use of various liquids for separation of paraffinic from naphthenic compounds, including dewaxing.

Sulfur dioxide in liquid form at about 15° F. extracts organic sulfur—containing compounds, reduces carbon, increases the percentage of saturated hydrocarbons and improves viscosity index. The important property that makes liquid sulfur dioxide a good selective solvent is the fact that when it is mixed with the oil a separation into two liquid phases takes place. This is a property common to all satisfactory selective solvents. The naphthenic substances, being more soluble, are concentrated in the solvent, and the less soluble paraffins collect in the second or upper oil solution. These are withdrawn from the system and the solvent removed and recovered, usually by distillation. The solvent phase is called the extract and the oil phase the raffinate.

PROPERTIES OF SOME SELECTIVE SOLVENTS

TEMPERATURE, °F.

Solvent—	V.G.C.	C.S.T.	Sp. gr.	M.P.	B.P.
Acetone	.843	127	0.80	—137	133
Acrolein	....	...	.84	—125	126
Aniline	.832	192	1.03	21.5	363
Benzaldehyde	.824	68	1.05	—69	355
Benzol	....	...	0.88	42	175
Chlorex (dichloro-ethyl ether)	....	...	1.22	—61	352
Cresylic acid	.838	73	1.04	*—100	365
Crotonaldehyde	....	...	0.86	—101	215
Furfurol	.829	125	1.16	—34	323
Nitrobenzene	.823	79	1.21	47.7	412
Phenol	.830	181	1.07	109	361
Propane	....	...	.54 (at 32°F.)	...	—49
Propyl alcohol-N...	.865	98	0.80	—197	207
Sulfur dioxide	.840	...	1.43	—105	14

*Below.

Note—The abbreviations indicate: V.G.C., viscosity gravity constant; C.S.T., critical solution temperature; Sp. gr., specific gravity; M.P., melting point; B.P., boiling point.

A good selective solvent should have a particular attraction for the naphthenic oils and thus be capable of effecting a sharp division between naphthenic and paraffinic components. It must be stable under the conditions of use and storage, be capable of full recovery without change in properties. A very important desirable property is that the solvent shall remain liquid and active at a very low temperature to permit the complete removal of all substances which may act to cause solidification at high, relatively normal, temperatures.

The important physical properties of some of the better known compounds used for the solvent refining of lubricating stocks, are mentioned in the table.

These solvents have been adapted in most of the processes by combining two or more reagents for three types of refining, as shown by Wilson and Keith:

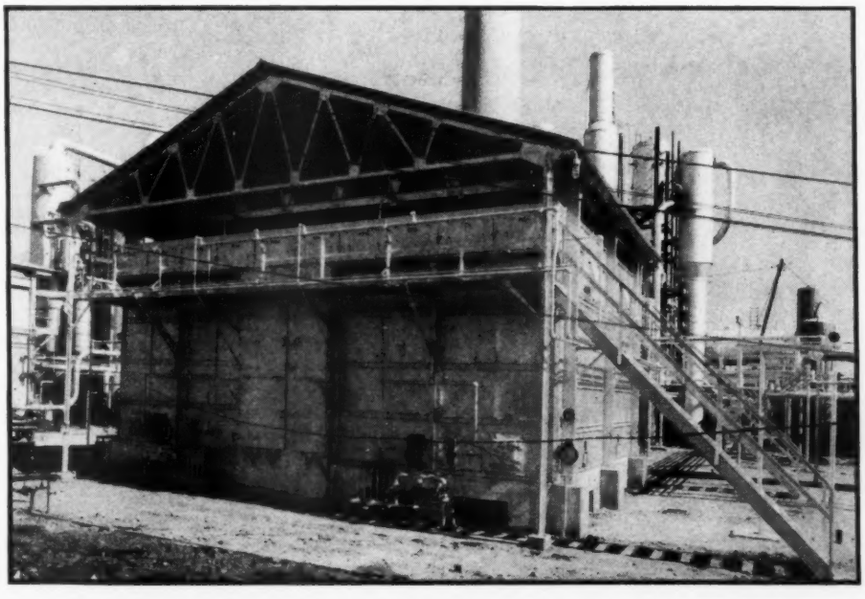
1. Solvent dewaxing, including the acetone-benzol process, centrifugal dewaxing with chlorinated solvents, and the use of propane as a combined refrigerant and diluent for dewaxing various types of oils.

2. Solvent extraction processes, which should be further subdivided into (a) single solvents such as phenol, chlorex, nitrobenzene, furfuraldehyde, and sulfur dioxide, the latter with or without benzene; and (b) double solvent processes may employ any of the above mentioned single solvents, but the present commercial installations utilize cresylic acid as the second solvent.

3. Deasphalting processes employing liquid propane or similar very light hydrocarbons. These are not classified as single solvent processes because the ordinary single solvents dissolve the more naphthenic and asphaltic constituents and leave behind the paraffinic, whereas propane alone at ordinary or slightly elevated temperatures tends to dissolve the paraffinic and most of the naphthenic constituents but throws out the asphaltic materials. It also appears to make its separation more on the basis of boiling points than of paraffinicity, although it is somewhat selective in the latter respect.

The dewaxing of raw lubricating oil stocks has always been a problem because the wax is found in many crude oils in two conditions; one forming crystals, easily separated by the plate filter, and the other, being amorphous, remains in the oil. The original method for reducing this amorphous wax requiring many weeks, was cold-settling from a naphtha solution. This was improved upon by the introduction of the centrifuge, which removed a large part of the amorphous wax from a cold naphtha-oil solution. Acetone was one of the first liquids to be introduced for solvent dewaxing. This has been followed by several others, used singly or in various combinations.

The several extraction methods vary in details but the principles are similar. The first method was to contact the solvent and the oil in a single stage in an agitator. The two phases were then separated after settling. The next step was to bring the two liquids together in a series; the once treated oil was passed to a second treating tank where the first operation was repeated. This multiple contacting was repeated a number of times until the de-



Heater serving the new furfural solvent unit at the Beaumont, Tex., refinery of the Magnolia Petroleum Co., one of the large installations made in 1936

sired result was obtained. The final improvement included extraction by counter-current treatment, meaning the oil and solvent were intimately mixed by bringing them together while flowing in opposite directions. All of these may be applied by batch or continuous operation; the recent practice is to use the continuous system.

The extracted oil may receive an acid treatment, a neutralizing wash, filtration through fuller's earth and then dewaxed by solvent treatment. Some refiners finally contact with a light filter through fuller's earth. The recovery of solvent and necessary separation of liquids is accomplished by heating and distillation. A brief outline of the phenol process will serve to illustrate the general method.

The operation with phenol consists of a counter flow mixing of the oil and solvent through a series of seven mixing tanks. Both liquids are preheated to 110°-125° F. before entering at the opposite ends of this seven-stage counter-current contacting unit. The solvent-oil ratio was from 1 to 1.3 for a heavy oil. The treated oil, containing 8 to 15 per cent phenol, from the final tank is pumped to a still from which the hot vapors flow to a bubble-plate tower for recovery of the phenol.

The solvent phase is discharged from the first settling tank, which is beyond the contacting unit to be cooled, and then settled at 95°-100° F. The oil separating from this cooled solvent phase may contain about 30 per cent oil. This oil is pumped to a phenol recovery unit.

One remarkable feature of solvent refined lubricating oils is the low carbon residue; the reduction over conventional methods is often of the order of 60 per cent. A comparison is shown in the table.

CARBON RESIDUE IN LUBRICATING OIL

Origin—	Oil refined by method— Usual	Solvent
Mid-Continent	0.80%	0.28%
Pennsylvania	.88	.29
Pennsylvania	.55	.34

The important factors which have contributed to the very rapid expansion of plants for solvent refining include the desire of the oil refining industry to make a lubricating oil of uniform quality regardless of the origin of the crude oil. Also, the motor of today requires the best oil, one permitting easy starting, with no tendency to break down under high temperatures and speed. Examination of engine parts has demonstrated the superior quality of solvent refined lubricating oils.

References: Wilson and Keith, Jr., The Oil and Gas Journal, July 19, 1934, page 14; Wiggins and Hall, J. Inst. Pet. Tech., 22, 78, 1936; Buchler and Diggs, The Oil and Gas Journal, April 20, 1933, page 14; Cottrell, The Oil and Gas Journal, December 1, 1932, page 10.

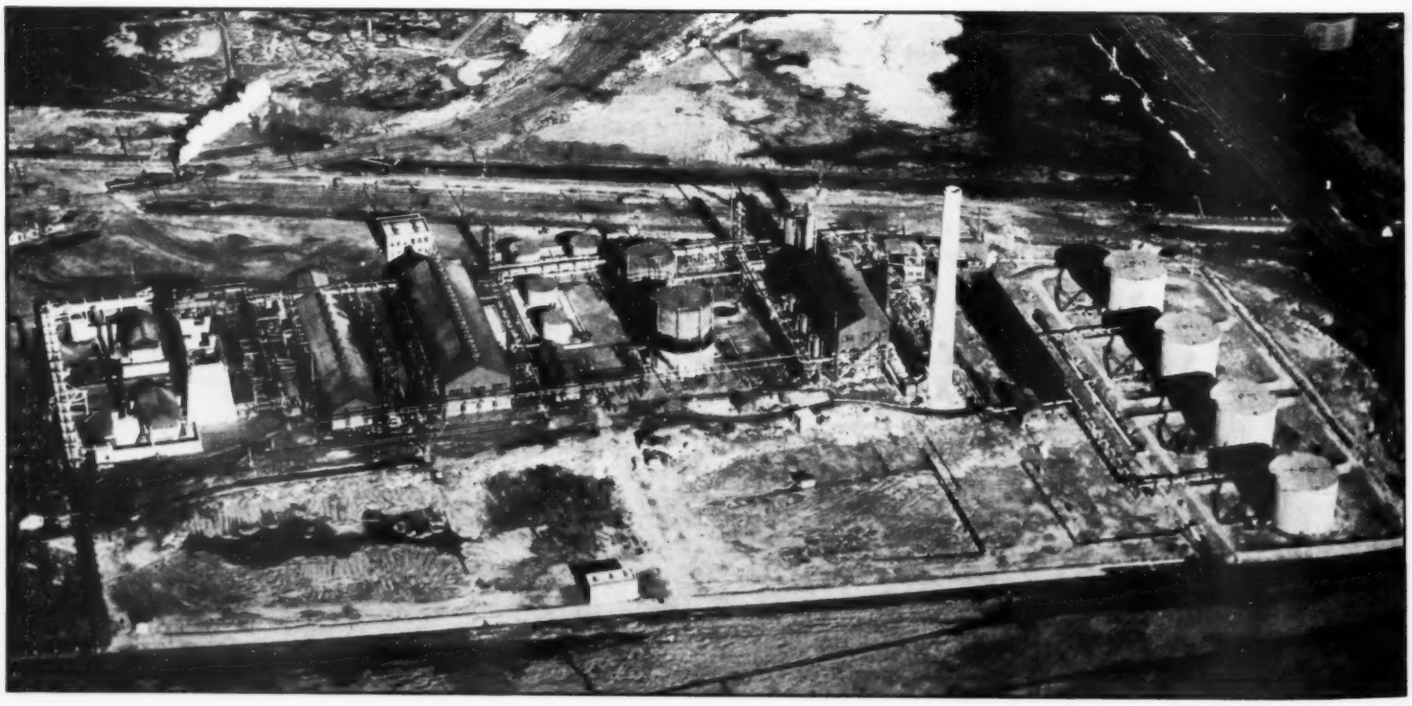
SOLVENT EXTRACTION AND DEWAXING PLANTS, DOMESTIC, MARCH, 1937

Company and location—	Type—	Output bbls./day
Atlantic Refining Co., Philadelphia, Pa.	Nitrobenzene, Benzol-Acetone-Toluol	1,000
Bradford Penn Refining Corp., Clarendon, Pa.	Chlorex, Propane	450
Continental Oil Co., Ponca City, Okla.	*Bari Sol	500
Freedom Oil Works, Freedom, Pa.	Chlorex	1,200
Gulf Oil Corp., Port Arthur, Tex.	Acetone-Benzol-Furfural	5,000
Gulf Oil Corp., Girard Point, Pa.	Duo Sol	3,700
Humble Oil & Refining Co., Baytown, Tex.	Phenol	2,000
Indian Refining Co., Lawrenceville, Ill.	Furfural	1,850
Kendall Refining Co., Bradford, Pa.	Chlorex-Propane	1,100
Magnolia Petroleum Co., Beaumont, Tex.	†Duo Sol-Acetone-Benzol-Furfural	3,000
Mid-Continent Petroleum Corp., Tulsa, Okla.	Chlorex	200
Pennzoil Co., Oil City, Pa.	Chlorex	1,000
Quaker State Oil Refining Co., Farmers Valley, Pa.	Furfural-Benzol-Acetone	1,000
Shell Oil Co., Martinez, Calif.	Sulfur dioxide-Benzol	1,750
Shell Petroleum Corp., Wood River, Ill.	Propane	2,400
Sinclair Refining Co., Wellsville, N. Y.	Nitrobenzene	800
Socony-Vacuum, Olean, N. Y.	Chlorex-Benzol-Acetone	3,800
Socony-Vacuum, Paulsboro, N. J.	Duo Sol-Acetone-Benzol	4,200
Standard Oil Co. (Calif.), Richmond, Calif.	Sulfur dioxide	3,000
Standard Oil Co. (Ind.), Casper, Wyo.	Chlorex	600
Standard Oil Co. (Ind.), Wood River, Ill.	Chlorex-Propane	1,300
Standard Oil Co. (La.), Baton Rouge, La.	Bari Sol-Phenol	5,200
Standard Oil Co. (N. J.), Bayonne, N. J.	Phenol	1,000
Sun Oil Co., Marcus Hook, Pa.	Propane	1,000
Texas Co., Port Arthur, Tex.	Furfural-Sulfur dioxide-Benzol	4,000
Tide Water Associated Oil Co., Avon, Calif.	Sulfur dioxide-Benzol	1,500
Tide Water Associated Oil Co., Bayonne, N. J.	Sulfur dioxide-Benzol	1,750
Union Oil Co., Oleum, Calif.	Benzol, Sulfur dioxide-Propane	2,000

*Bari Sol = Ethylene dichloride and benzol or carbon tetrachloride.
†Duo Sol = Creysilic acid and propane.

SOLVENT EXTRACTION AND DEWAXING PLANTS, FOREIGN, MARCH, 1937

Company and location—	Type—	Output bbls./day
Aquila S. A. Tecnico Industriale, Trieste, Italy	Sulfur dioxide, Benzol	700
Burmah Oil Co., Rangoon, Burmah, India	Sulfur dioxide	1,750
Deutsche Vacuum Oel, Bremen, Germany	Duo Sol, Benzol-acetone	1,000
Gewerkschaft Elwerath, Hanover, Germany	Furfural, Benzol-acetone	1,700
Green Co., Herbert, East Halton, England	Duo Sol, Benzol-acetone	1,500
Imperial Oil Co., Ltd., Sarnia, Canada	Phenol	2,000
Photogen Rafinerie de Petrol, Brasov, Rumania	Furfural	300
Raffineria di Napoli, Naples, Italy	Duo Sol, Benzol-acetone	750
Rhenania-Ossag, Mineraloelwerke, Hamburg, Germany	Sulfur dioxide	1,750
Rhenania-Ossag, Mineraloelwerke, Monheim, Germany	Sulfur dioxide	42
Shell Refineries, Ltd., Shell Haven, England	Furfural, Benzol-acetone	1,500
Societe Generale des Huiles de Petrole, Courchelettes, France	Sulfur dioxide, Benzol	450
S. A. Petrofina, Dunkerque, France	Benzol-acetone	500
Standard Franco-Americaine de Raffinage, Port Jerome, France	Phenol, Trichloroethane	3,500
Vacuum Oil Co. (S.A.F.), Paris, France	Duo Sol	750
Yacimientos Petroliferos Fiscales, La Plata, Argentine	Sulfur dioxide	1,050



General view hydrogenation plant in the Bayway refinery of the Standard Oil Co. of New Jersey

Combination Unit Varies as to Charging Stocks

The Pure Oil Co. for several weeks has had in operation at its Toledo, Ohio, refinery a combination cracking unit of the selective type designed to yield high octane gasoline and merchantable fuel oil under a wide range of operating conditions determined largely by available charging stocks. The 8,000-bbl. unit of Lummus design is to be duplicated at the Toledo refinery with a third unit located at the company's Heath refinery.

The Toledo unit was designed to operate with Mid-Continent and Michigan crudes, which necessitated considerable flexibility in the cracking division in order to secure finished products of approximately the same specifications. The straightrun gasoline from Michigan crude is relatively low in octane rating, and this has been compensated for in the method of operation in order to secure finished gasoline meeting high octane standards.

TWO CRUDE SUPPLIES

The plant, since it was completed the latter part of last year, has operated with both Mid-Continent and Michigan crudes. Recently, with Mid-Continent crude, the unit was operated as a four-coil selective unit for several days.

The accompanying simplified flow diagram shows the main features of the unit. The reformer furnace is used for reforming the very low octane heavy naphtha when processing Michigan crude and is used as a once-through straightrun, gas oil cracking furnace when processing Mid-Continent crude with high conversions per pass. Further selective cracking has been accomplished on the recycle gas oil coil by controlling the endpoint and maintaining good color, this coil having been operated to as high as 1,010° F. outlet at 600 pounds pressure for the production of high octane gasoline with minimum gas loss and no deposition of coke in the furnace tubes.

HIGH OCTANE GASOLINE

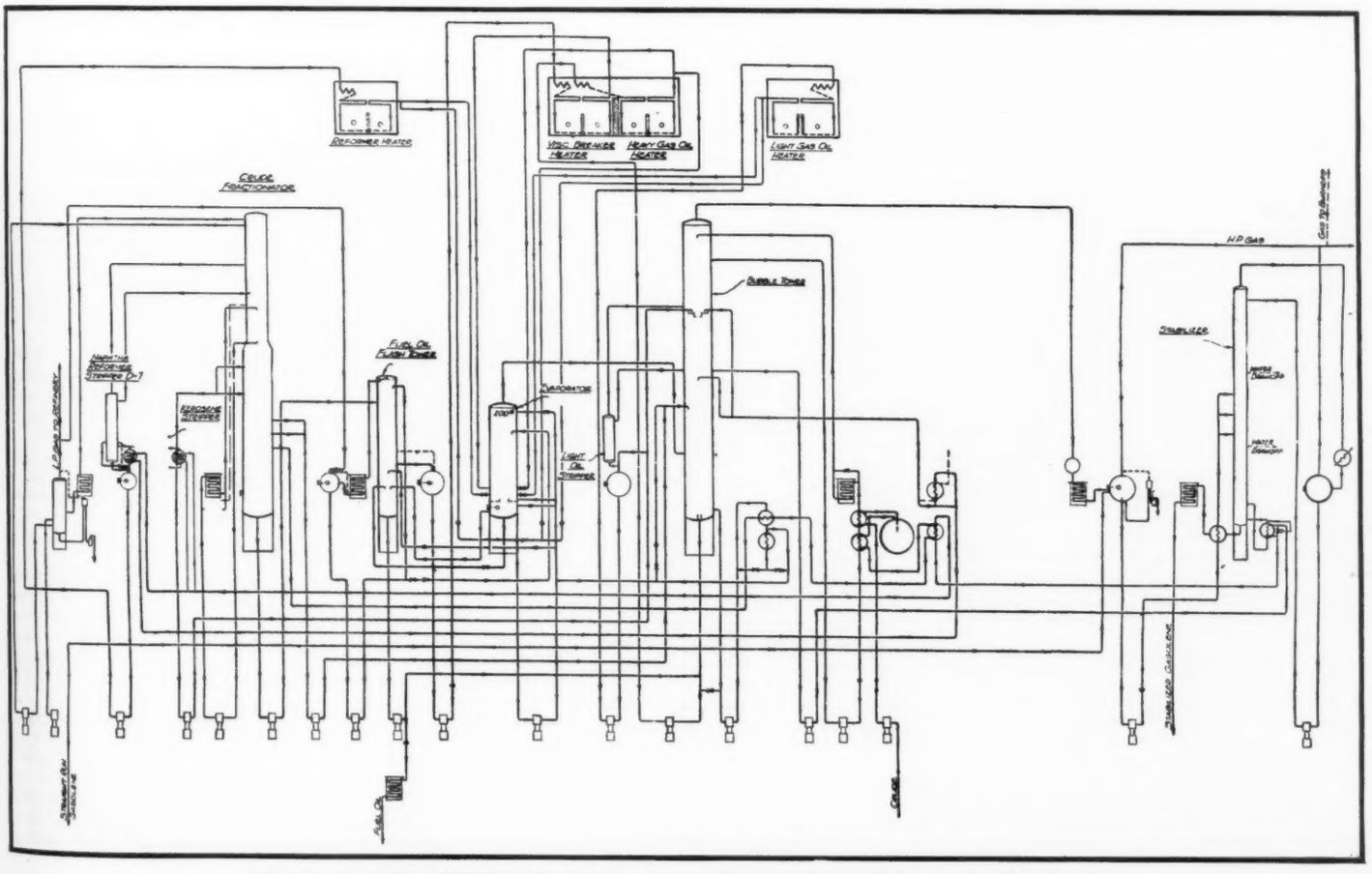
The combined straightrun and cracked gasoline produced from this unit was 66-67 octane number on the Mid-Continent crude and 63 octane from the Michigan, 10-pound Reid vapor pressure, while cracking for the production of gasoline and Bunker "C" fuel oil. The stabilizer performance has been unusually good with no propane in the stabilized product and no butane in the gases off the top of the stabilizer.

The Bunker "C" fuel produced from Michigan crude has average 9 A.P.I. gravity, 200 vis. fuel oil at 122, 15° pour, .01 per cent sediment and stable after aging several months. The tar from Mid-Continent crude ran 8 A.P.I. gravity, 250 vis. fuel oil at 122, 30° F. pour, .01 per cent sediment.

GAS DRIVEN PUMPS

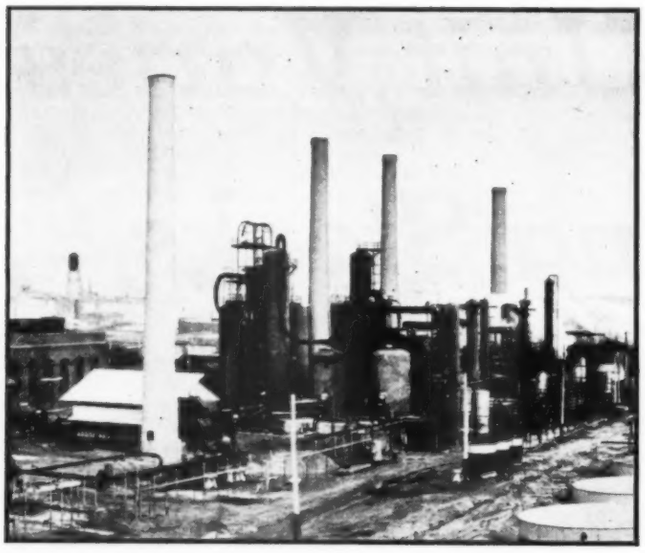
A number of the furnace charge pumps for this unit are gas engine driven with steam engine driven spares. The operation of these units has been very satisfactory. The pumps are located in a pump house, which is subdivided into hot oil and cold oil pumps, while above this pump house are some of the furnace charge accumulators, the control house and the box coolers and condensers. The unit is supplied with automatic control equipment throughout and the operation is extremely steady. The Michigan crude, which contains considerable quantity of salt, is settled in electrostatic salt settling equipment, where 95 per cent of the original salt is removed before it is pumped into the cracking unit.

One of the novel features of this plant is the Lummus type furnaces with separate heating and soak sections for each stream. The performance during these tests has been unusual with per cent CO_2 in the stack above 11 per cent and with 15-20 per cent excess air. The muffle temperatures have been well under 1,500° F.



Flow diagram of the 8,000-bbl. per day combination cracking unit at the Pure Oil Company's Toledo refinery

Continental Oil R in 7,500 Bar re



General view of combination unit at Continental Oil Co.'s Baltimore modernized refinery

The revision recently completed by Continental Oil Co. at its Baltimore refinery has proved that large savings can be effected in initial investment costs by the judicious use of existing equipment, without loss of operating efficiency if a careful engineering and economic study is made of the requirements and equipment available.

Every refiner is at one time or another faced with the problem of modernizing his equipment to take advantage of developments in the refining art. In modernizing a plant, the paramount problem is the use of existing equipment. Such equipment usually does not fit economically the process requirements. It is either too large, requiring additional initial investment cost, or too small, which, if used, would result in lower operating efficiency.

Continental Oil Co. was confronted with such a problem at its Baltimore refinery, where the complex operation made necessary by processing sour West Texas crudes was carried on in widely scattered units that were obsolete in the light of present-day operation of combination topping, cracking and stabilization units.

PRUDENTIAL PLANT

The refinery, prior to its revision, was essentially the same as acquired from the Prudential Refining Corp. in March, 1929. The cracking equipment consisted of four small Dubbs stills which had been modernized to a degree by the addition of hot oil pumps and furnace roof tubes, and two small conventional Cross stills with horizontal reaction chambers. This equipment was located at one end of the refinery, approximately one-half mile from the center of the plant where the crude skimming pipe stills, pressure distillate rerun unit, and boiler house were located.

Since the acquisition of the refinery, the company had added a new pressure distillate stabilization and gasoline recovery plant, located near the cracking stills but separately operated, and a Stratford[1]* continuous acid treating plant. Few other changes had been made.

All crude supplied to this refinery was and still is transported by steamships owned and operated by the company. Sour Texas crude was processed nearly exclusively up to the time of the revision.

Consideration had previously been given to the revision of the Baltimore refinery into a compact, modern plant; but so long as sour crude was processed, necessitating acid treating and rerunning of the pressure distillate and heavy, straightrun gasoline, the poor geographic relationship of units and the partially obsolete design of cracking equipment did not result in sufficient increase in processing expense to justify a very large expediture for modernization.

With the bringing in of the Tepetate[2] crude field in Louisiana by Continental Oil Co. approximately two years ago, an adequate supply of high-gravity sweet crude became available for the Baltimore refinery, which immediately made it apparent that a material reduction in losses and operating expense could be made and that improvements in yield, octane number, and volatility of gasoline would be possible by a complete revision of the plant.

COMBINATION UNIT DESIGN

A complete combination unit was designed to process 8,650 bbls. a stream day of 41° A.P.I. crude, and crack therefrom 3,500 bbls. a day of topped crude. The balance of the crude was to be removed as straightrun gasoline and furnace oils.

From the preliminary study of the equipment required for the desired capacity, it was apparent that a large amount of existing material could be utilized to good advantage in a new combination unit. In order to use the economic maximum of existing equipment, the authors spent considerable time in Baltimore developing the complete process design of the unit, checking the condition and suitability of existing equipment, and determining what new equipment would be required.

The extent to which existing equipment was used can best be illustrated by a few examples.

To centralize the new unit in the plant with respect to other operations left intact and to take advantage of existing furnaces, towers, pump house, etc., the new unit was located on the site of the existing crude topping stills.

Two of the three furnaces required by the design were available at the location selected. One was utilized for additional preheat following orthodox exchange of the partially topped crude to remove the furnace oils and gas oil, the other to visbreak topped crude. To give the desired flexibility between temperature and soaking time on the variable charging stocks to be cracked, a new Alcorn, double-end fired radiant heater was installed for vapor-phase cracking.

FRACTIONATING TOWERS

With the exception of a new vapor-phase fractionating tower, two Gray towers, and an absorber, all other fractionating towers were available from the crude topping and Cross units. Only one tower, however, used for removing the furnace oils and gas oil, remained in its original location.

After reconditioning the equipment, the existing gasoline stabilization and recovery unit suited the requirements for the revised operation and was utilized in its entirety by the new design, with the exception of the absorber, which was replaced with a new column to obtain increased efficiency, the old one being converted into a straightrun gasoline stabilizer.

A large number of the existing closed exchangers and condensers were reconditioned for use as aftercoolers on the various streams to obtain better heat transfer rates and decrease the amount of new condensing and cooling surface required.

Additional equipment, such as pumps, control instruments, piping, etc., was salvaged, reconditioned and used.

A rather complex design was required since the unit must, as a future contingency, be capable of processing any of several crudes and produce separately and simultaneously a large number of products. From the crude it was necessary to produce a stabilized straightrun gasoline, naphtha, kerosene or No. 1 furnace oil, No. 2 furnace oil, and topped crude. From cracking it was necessary to produce a stabilized Gray tower-treated cracked gasoline, stabilized high-gravity gasoline, a No. 4 furnace oil, and two grades of fuel oil—one, for sale, of low gravity, low viscosity meeting somewhat better than Bunker "C" specification, and the other of low gravity, high viscosity for plant consumption.

Since all gas produced is sold, a very unusual condition exists in that all fuel consumed in the plant must be fuel oil.

This was an ideal condition to permit designing for higher gasoline yield from cracking a given gravity topped crude than would otherwise be possible when having to produce all fuel oils as salable products.

FUEL OIL SYSTEM

To take advantage of this condition, all fuel oil burning systems were carefully designed to handle a very low gravity, high viscosity oil. Likewise, careful attention was given to the balance between steam and electrical power for driving the equipment so that all of the viscosity breaker fuel oil not required by the stills could be used in producing steam, and that maximum economic advantage would be taken of this steam.

This quantity of steam was more than that required by the various pumping duities for supplying 10-pound exhaust steam requirements of the plant for heating purposes, but insufficient to supply all power required for driving the many pumps, fans, etc.

The best balance was obtained by equipping the furnace charging pumps with condensing turbine drives to obtain the low water rates possible on such large units, while sufficient of the smaller units were operated at 10-pound back pressure to produce the required heating steam. The balance of the power requirement was supplied in the form of 60-cycle electricity, which required converting the 25-cycle power available in the plant to 60-cycle to take advantage of more favorable power applications of the latter.

From the flow diagram it will be seen that the unit was designed to produce the straightrun gasoline, naphtha, and kerosene from the first fractionating tower, all heat being supplied by means of exchange with waste heat from the various streams, but obtained largely from the cracking unit.

The partially topped crude from the first tower receives additional preheat in the crude furnace and passes into a second tower from which two grades of furnace oil and a gas-oil cut are removed. The topped crude from the base of this tower is transferred to the viscosity breaker fractionating tower providing stock for this cracking operation.

The viscosity breaker furnace operates as a

*Refers to bibliography.

Revamps Distillation Units

rel Baltimore Refinery

By D. R. JOHNSON and J. H. OLEHY
Process Design Engineers, Continental Oil Co.

black oil cracking coil, the topped crude and cycle stock being heated as rapidly as possible to the desired temperature and transferred to a vertical reaction chamber for additional soaking time. Experience had proved that this type of operation made possible the maximum degree of viscosity breaking with the minimum amount of coking difficulties.

Pressure is released at the outlet of the reaction chamber and the oil passes into a conventional evaporator operating at comparatively low pressure, making it possible to produce for plant consumption a very low gravity, high viscosity fuel oil. Under these conditions, the heavy gas-oil fractions are readily removed overhead along with the lighter products, and pass into the fractionating tower.

From the viscosity breaker bubble tower, a 650-675° F. endpoint flashed distillate is produced, exchanged against crude, condensed, and the gases removed. This distillate is then transferred to the vapor-phase fractionating tower and provides, together with any virgin gas oil from the second crude tower, the feed for the vapor-phase cracking unit.

The gasoline content of this distillate is fractionated overhead while the remaining light gas oil, together with the light refractory cycle gas oil in the system, is charged through the vapor-phase furnace and cracked at a high temperature.

Equipment was provided for carrying out a partial naphtha reforming operation by charging the naphtha cut produced from the first crude tower into the vapor-phase charging stock just ahead of the furnace.

UTILIZE HEAT

The combined stock from the vapor-phase furnace, passing into a conventional evaporator for the removal of its fuel oil, contains a large amount of excess waste heat which is conveniently removed by exchanging the vapors against crude. The condensate formed is trapped back into the top of the evaporator to effect the required cooling and supply the necessary wash to keep the bubble trays free of coke.

Since the vapor-phase fuel oil is entirely produced from cracking a light gas oil, it is obvious that a low gravity, low viscosity product meeting somewhat better than Bunker "C" specifications can be readily produced.

The combined vapors from the partial condensers after going through the evaporator pass into a tower installed between the evaporator and the main fractionating tower, thus removing any high endpoint, high carbon residue material which may be carried over from the evaporator. Such stock as may be produced from the base of this intermediate tower is returned to the vis-breaker fractionating tower. This assures a light clean cycle gas oil going to the vapor phase furnace.

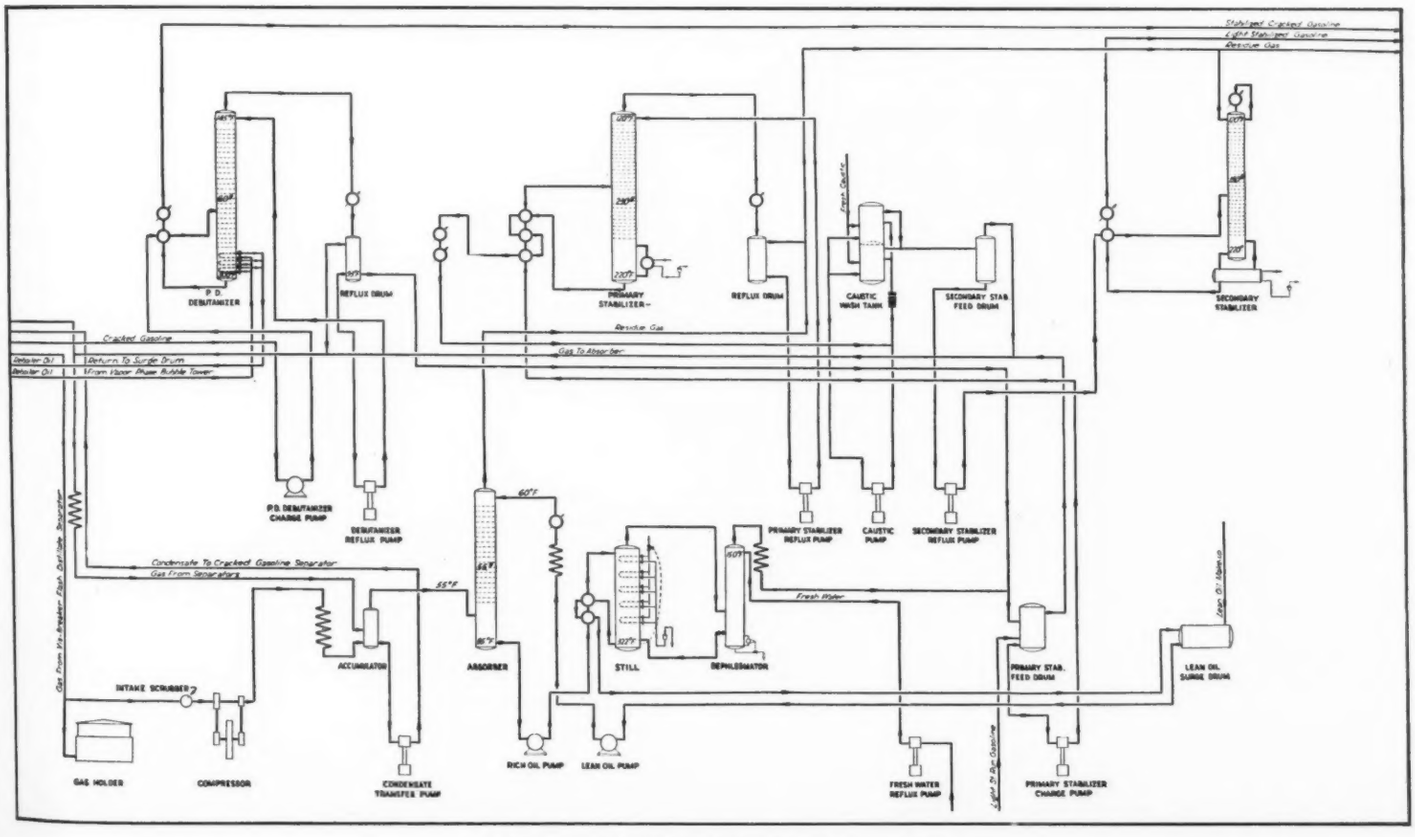
All cracked gasoline produced is taken from the vapor-phase fractionating tower and treated in the vapor state through Gray towers, the gasoline endpoint being controlled by refluxing the final fractionator shown. The gasoline is then condensed and processed through the stabilization and recovery portion of the unit.

Polymers produced from the Gray towers and final fractionator are returned to the vis-breaker evaporator.

In general, the tendency today in design and operation is to produce a stabilized gasoline of the desired vapor pressure to be stored in vapor-tight tankage, protected with a breather balloon system. Several contributing factors in our decision for not following the conventional design were that during the former operation of the plant a large amount of casinghead pressure storage had been built; that excessive expenditures would have been required for a breather balloon installation and to make all base gasoline tankage vapor tight;

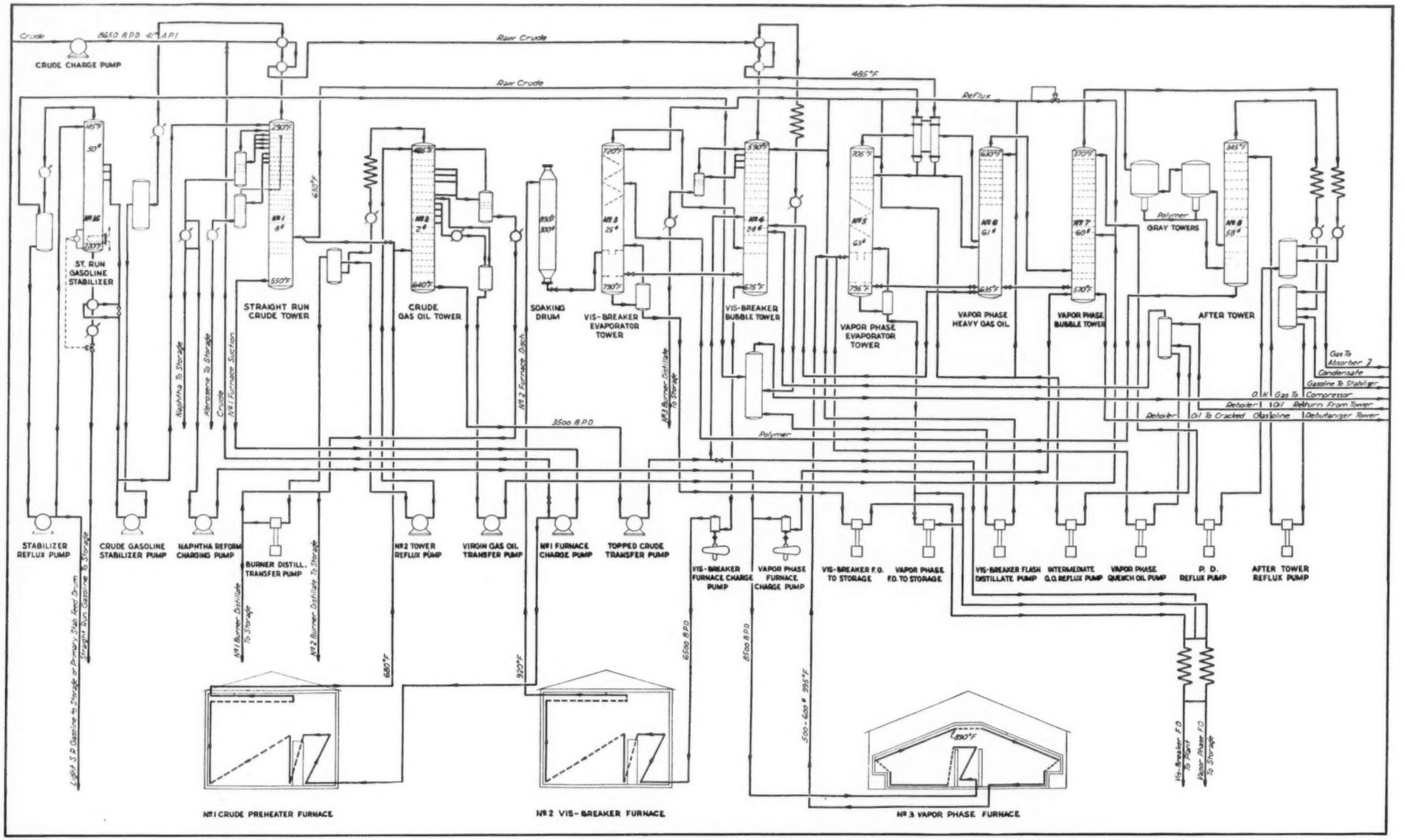
(Continued on Page 96)

COMPLETE FLOW-CHART PAGE 92

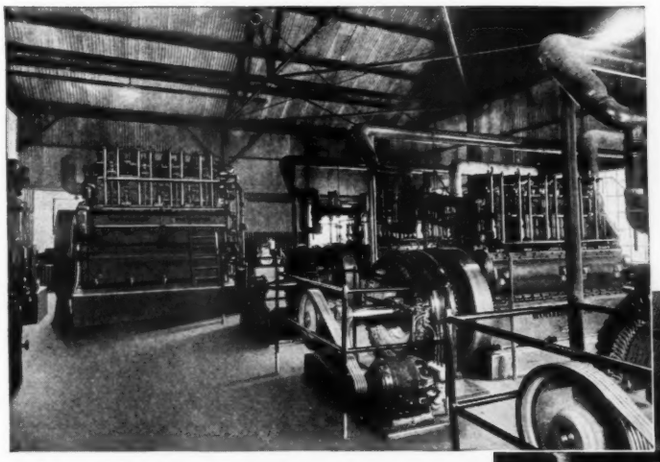


Flow diagram—Gasoline stabilization and recovery unit

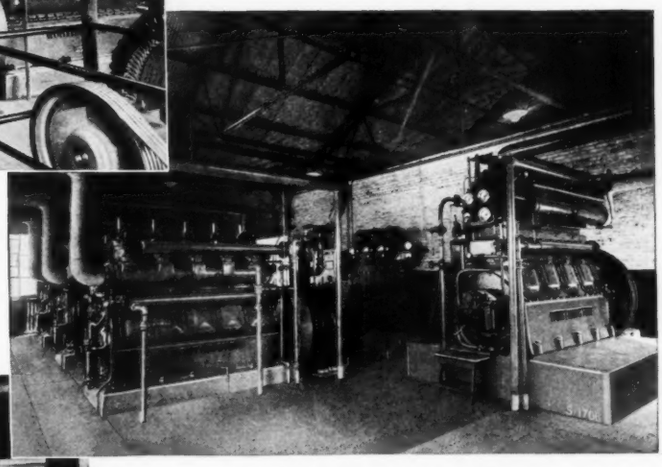
Flow Diagram of Continental Oil Company's New Combination Topping and Cracking Unit



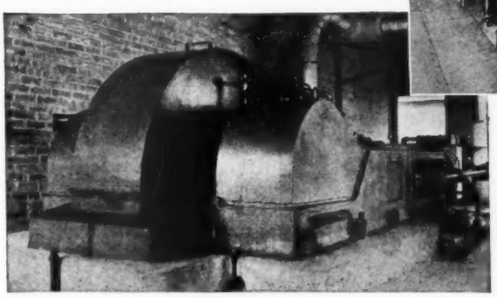
WORTHINGTON DIESEL and GAS ENGINES ARE MEETING EVERY DEMAND *for* ECONOMICAL POWER PRODUCTION



Three Worthington 150-hp. Gas Engine Generator Units . . . Worthington Multi-V-Drive on exciters . . . at Coastal Refineries, Port Isabel, Texas. Engines equipped to operate with gasoline if necessary. In background, Worthington 200-hp. Diesel Engine.



Another view of the Gas Engines, with the Diesel Engine at the right. The Diesel Engine is driving the Worthington Hot Oil Pump shown in illustration at left.



Worthington 4½" x 18" Hot Oil Charging Pump, separated by fire wall from the Diesel Engine shown above.

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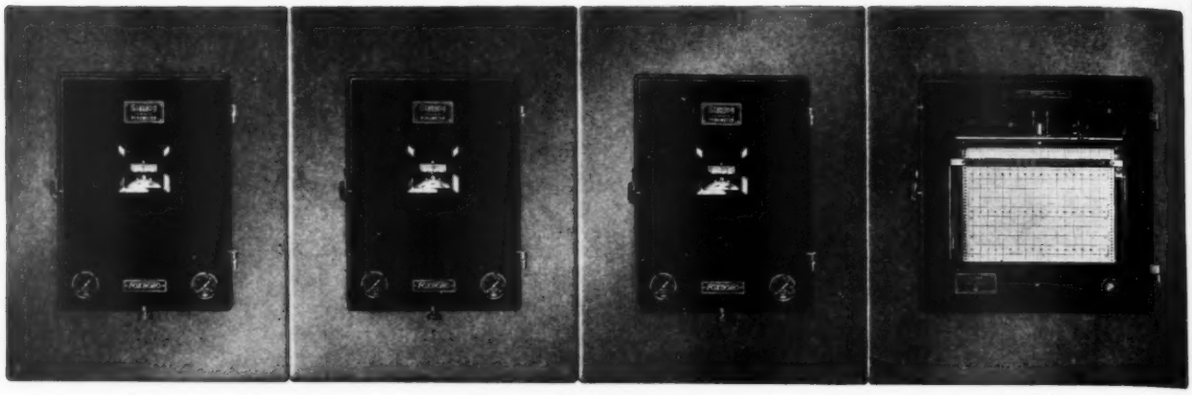
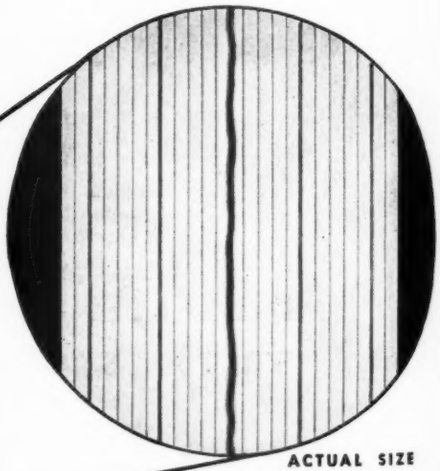


Above: Three Stabilog Potentiometer Controllers, with a multiple-record Foxboro Potentiometer Recorder which is recording a number of important temperatures around the refinery, including the three controlled temperatures . . . At left is the Stabilog Potentiometer Controller with the built-in Deviation Recorder, which records control results on a simple, inexpensive chart, without interfering with control action. The chart is comparable to a 2-inch section cut out of a 12-inch wide chart.



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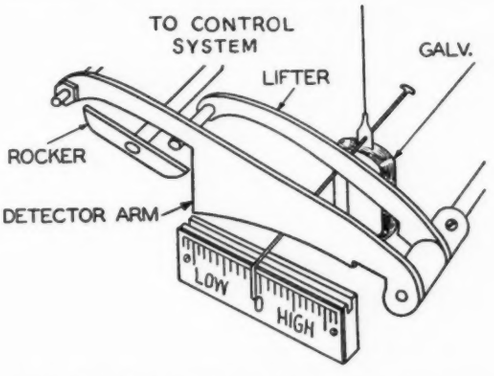
STABILOG POTENTIOMETER CONTROLLER



For smooth, profitable refinery operation, pipe stills and towers need the most accurate temperature control obtainable. And that's what the Stabilog Potentiometer Controller is especially designed to give you; its sole function is to make temperatures hew to the line when operating conditions are balanced . . . and to hold down variations and re-align them quickly when an upset occurs.

The detecting device, shown at right, has nothing to do but watch for variations in temperature and put the Stabilog control system into action when a variation occurs. Because it can concentrate on this single job, it gives quicker detection and correction of temperature fluctuations; the absence of any dead spots means *super-responsiveness.*

The primary reason for using automatic temperature control is to get the best possible control with the least attention—and if you choose control instruments on this basis, you'll choose the Stabilog Potentiometer Controller.

New Bulletin 194-1 gives full details. The Foxboro Company, 60 Neponset Ave., Foxboro, Mass., U.S.A., branch offices in 25 Principal Cities.

FOXBORO

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POTENTIOMETER CONTROLLERS

(Continued from Page 91)

and that Continental Oil Co. had at its Tepetate crude field its own gasoline recovery plant, casinghead from which is returned to the stabilized crude to be stored and shipped to Baltimore, where it must be removed and stored separately.

It was therefore decided to produce and store separately, in regular tankage, low-vapor pressure, straightrun and cracked stabilized gasoline, and to produce and store in pressure tankage a light stabilized gasoline. To accomplish this, debutanizers were installed on both gasoline streams. The light gasoline from the straightrun stabilizer or debutanizer, if propane free, may be transferred direct to the sweeteners, thence to storage, or if not, processed through the balance of the stabilization plant together with the light cracked gasoline.

While the elaborate gasoline stabilization and recovery plant may seem to the reader unnecessary in connection with a modern topping and cracking unit, it is quite essential for the economic production of a gas of low enough organic sulfur content to meet the customer's requirements. While the cracking plant gases contain quantities of hydrogen sulfide and other organic sulfur compounds, only the latter is objectionable to the purchaser and must be removed with a minimum of operating expense. To accomplish this, it is necessary that the absorber operate at higher than 90 per cent butane recovery. The light gasoline removed and recovered from the still after the absorber, from the cracked gasoline debutanizer, and from the straightrun gasoline stabilizer (unless the gasoline from the latter is propane free and goes direct to storage) must then be subjected to a double stabilization. The first is carried out at approximately 230 pounds, only the methane, ethane, hydrogen sulfide, and a small amount of propane being removed overhead, leaving the majority of the propane, heavier hydrocarbons, and organic sulfur compounds as a light liquid base product. This is then caustic washed to remove the sulfur compounds, after which it is fractionated in a second stabilizer to produce a propane-free light gasoline of the desired butane content.[3] This double stabilization eliminates the excessive expense which would be required for caustic washing the entire volume of gas. Obviously, if the entire volume of gas was caustic washed to effect the removal of the objectionable organic sulfur compounds, large quantities of caustic would be used up in the unnecessary removal of hydrogen sulfide.

A few additional features of interest, not apparent from the flow diagram, were incorporated in the design.

Experience from other cracking operations had shown that to avoid coke deposition it was necessary to retain the fuel oil in an evaporator a minimum of time when producing a low-gravity fuel oil. The existing towers used for evaporators were built too close to the ground to permit of small surge pots beneath them, so these surge pots were installed beside the evaporators with liquid level floats inserted within the pots so that a fuel-oil level of only an inch or two could be maintained in the bottom of the evaporators. In the case of the vapor-phase evaporator, this liquid level float controls a flow valve at the outlet of the fuel oil box, while on the viscosity breaker unit the float controls a steam throttle valve on the pump transferring the fuel oil from the evaporator to storage.

Water for condensing and cooling duties at a refinery in the Baltimore area is somewhat of a problem. Although there is adequate brackish bay water available at about 85° F. temperature, it is very corrosive and necessitates high maintenance on condenser coils and boxes unless expensive alloy metals are employed. The conventional cooling tower system circulating fresh water is not satisfactory due to the high humidity and the impossibility of maintaining low temperatures during the summer months. Previous experience, using a small supply of fresh well water, had proved that it was noncorrosive and very desirable in maintaining high efficiency, so four new deep wells were drilled to supply a total of 4,000 gallons a minute of 60° water.

Instrumentation of this unit was made more complete than is generally customary or absolutely necessary for the operation of such an installation. While it was difficult to justify several single instruments at particular points, it was thought that a well instrumented unit with close control on each product would pay good return in the end.

In addition to the essential pyrometers, pressure gauges, temperature, flow and level controllers, and pressure regulators, a number of special instruments were provided so that many points which normally would be hand-controlled could be operated direct from the control board.

All three furnaces were designed to burn high viscosity fuel oil and were equipped for remote firing control from the instrument board. This was accomplished by using two flow controllers, one on the fuel oil line and the other on the steam line. Micrometer screw adjustments manually made at the control board were employed to raise or lower the fires by increasing or decreasing the flow of fuel oil to the burners with an accompanying proportional change in steam quantity for the adjusted fuel oil quantity.

The feed to each of the various debutanizers and stabilizers was controlled by combination averaging type liquid level and flow controllers, so that average levels were maintained in the respective surge drums while very gradual changes were made in the charging rates to the fractionating columns.

All surge drums or separators for light products carrying appreciable quantities of water were equipped with interface level controllers for automatic withdrawal of water.

Liquid level recorders were installed on the control board for all fractionating towers. It was impractical to use the conventional manometer type level recorder for these installations since the control room was to be at second-floor height and the recorders were therefore higher than the levels to be measured. Manometers equipped for electrical transmission of level variations were used, which made it possible to locate the meter bodies adjacent to the towers, while the recording portion of the instrument was placed on the control board.

A unique thermo-well device (patent applied for) was installed on the outlet of the vapor-phase and vis-breaker furnace coils. This device consisted of a thermo-well made a part of a forged steel globe valve assembly, and so designed that if coke accumulated on the thermo-well the valve wheel could be turned, raising the well, and shearing off the coke. This device worked very satisfactorily the few times it was necessary to use it.

MECHANICAL CONSTRUCTION FEATURES

With the utilization of such a large amount of existing equipment in the design of the new combination unit, it was decided that the company could carry on the construction work in a more satisfactory manner and to better economic advantage than to contract it, although the cracking operation is licensed by the Gasoline Products Co.

Due to the nature of the job in general, and the lack of special equipment necessary to carry out all portions of the work without excessive expenditures for construction equipment, a considerable part of the work was subcontracted. The more important of the subcontracts were for the rigging work necessary to move and erect a large number of the existing towers, exchangers, condensers and condenser boxes; the drilling of the four fresh water wells, each to have a capacity of over 700 gallons a minute; the construction of an 80,000,000 B.t.u. release double-end fired vapor-phase, radiant-type furnace; revisions to the electrical system made necessary by converting from 25- to 60-cycle current; and insulation of the towers, lines, exchangers, etc.

An interesting but vitally important phase of the construction work was the reconditioning and shopping of all the old equipment which was salvaged and used in the new. W. M. Haynes organized a special group of highly experienced men from the refinery personnel to carry out this work. This group was responsible for towers and separator drums being cleaned, inspected, and tested; pumpes being cleaned and repacked; exchangers and condensers being shopped; tube headers, piping, valves, and fittings being salvaged, cleaned, reconditioned, and marked with the shop's O.K. before again being used. This reconditioning and inspection of equipment meant a great deal of tedious work, but it was quite necessary to be certain that only equipment substantially as good as new went into the unit. While it cost money, large savings were effected over the cost of purchasing new equipment.

In addition to the existing equipment adapted to the new unit, a great deal had to be purchased after securing competitive bids from which orders were placed.

PLANT OPERATION

The unit was placed in operation without difficulty, and to date has completed two 30-day runs, producing better than 53 per cent of 70 A.S.T.M. octane, 400° F. endpoint, 30 color, low gum content cracked gasoline from topped crude. This yield was obtained when No. 4 furnace oil was being produced from the cracking operation. Fuel oil yields were from 10 to 12 per cent of low viscosity vapor phase, and from 24 to 26 per cent of high viscosity vis-breaker fuel oil, based on topped crude.

The overall summary of yields is as follows:

	Per cent
Crude	100.0
Straightrun gasoline	34.0
Furnace oils	16.0
Cracked gasoline	26.0
Fuel oil	18.5
Gas and loss	5.5

Some of the more important characteristics of the charging stocks are shown in the following table:

TABLE NO. 1—CHARGING STOCK CHARACTERISTICS

	1	2	3	4	5	6
A.P.I. gravity	36–37	24–25	17–18	30.8	23.2	17.8
I.B.P., °F.	....	....	....	122	250	420
10 per cent	....	....	....	285	404	501
20 per cent	....	....	....	22% at 392° F.	...	...
50 per cent	....	....	....	509	492	560
90 per cent	....	....	....	625	596	658
Endpoint, °F.	....	....	....	675	650	720
Recovery	....	....	....	98	98	98
Color, A.S.T.M. (N.P.A.)	....	....	....	1½	2½	6

1. Crude oil.
2. Topped crude to viscosity breaker unit.
3. Viscosity breaker furnace combined charge.
4. Viscosity breaker tower overhead (charging stock to vapor-phase unit).
5. Vapor-phase furnace combined charge.
6. No. 6 tower bottoms.

While the majority of the viscosity breaker fuel oil will be consumed within the plant, any excess can readily be blended to salable specifications with either the vapor-phase fuel oil or with a light refractory gas oil such as No. 6 tower bottoms, either of which has an excellent viscosity reducing effect.

Characteristics of the two fuel oils produced are shown in table No. 2:

TABLE NO. 2—CRACKED FUEL OILS

	Viscosity breaker			Vapor phase		
Sample No.—	1	2	3	1	2	3
A.P.I. gravity	9.7	8.5	4.9	6.8	5.0	3.9
Furol vis. at 122° F.	280	460	1,575	100	200	1,340
Pensky-Martin CC. fl.	230	230+	230+	230+	230+	230+
B.S.&W.	0.8	1.0	1.2	0.2	0.2	0.2

While the unit has not been in operation long enough to date to test all points of design, the operation so far has been gratifying and indications are that it will meet design expectations of capacity, yields, and flexibility.

The construction work was under the supervision of M. E. Clawson, chief engineer of Continental Oil Co., who set up a field engineering organization at Baltimore with W. M. Haynes as chief construction engineer, assisted by E. A. Elledge as chief draftsman and field engineer, and T. G. Reynolds, the Baltimore refinery resident engineer. Much of the new equipment needed was bought by the Baltimore purchasing agent.

J. W. Brown, refinery superintendent, and W. M. Cooke, assistant refinery superintendent, checked all operating details during the design and construction of the unit.

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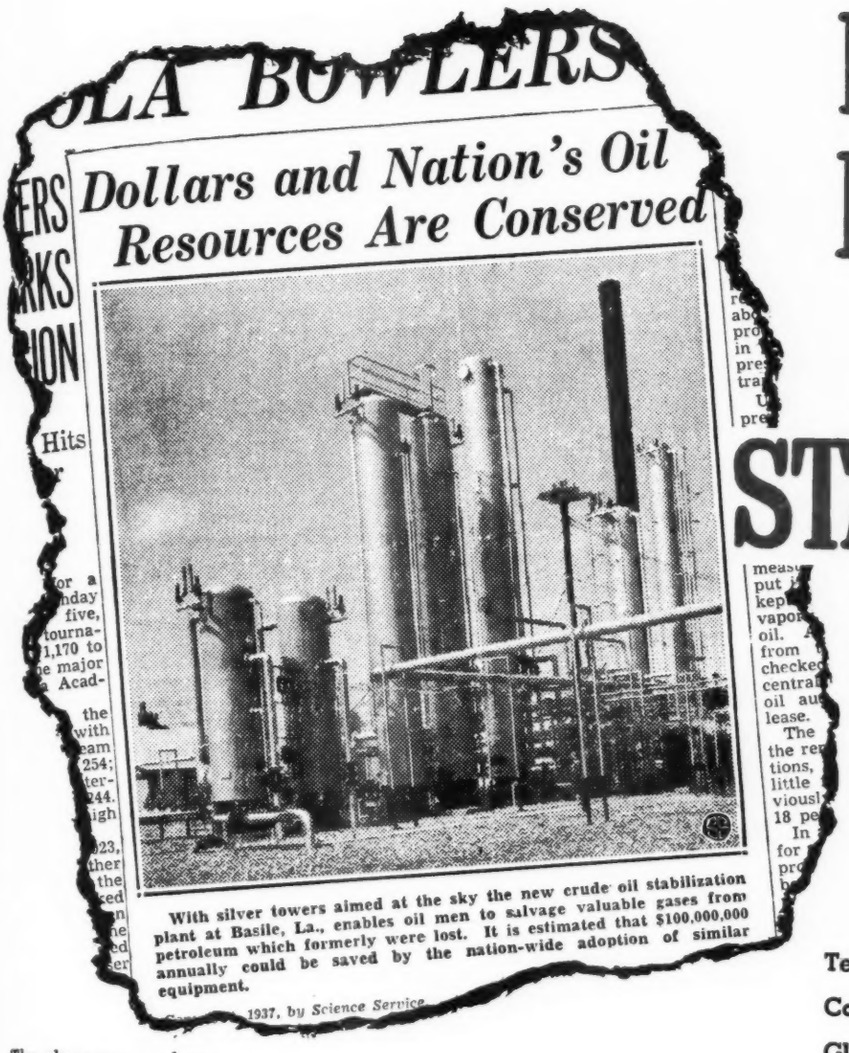
THE INDUSTRY DEMANDS CRUDE STABILIZATION



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Continental Oil Co.	7,500 bbls.	1936
Glen Rose Gasoline Co.	2,500 bbls.	1936
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Current Research Work on the Solvent Refining of Motor Oil

By L. C. STRANG, Ph.D., B.Sc., A.M.Inst.P.T.
Birmingham University, England

Lubricating oil stocks may be considered to be a mixture comprising (a) naphthenic constituents which consist of those hydrocarbons relatively poor in hydrogen and having a high value for the viscosity-gravity constant and a low viscosity index. (b) Paraffinic constituents which are relatively rich in hydrogen, and having a low viscosity-gravity constant and a high viscosity index. (c) Paraffin wax.

A good lubricating oil should have a low viscosity-gravity constant, a high viscosity-index and a low pourpoint, and it is therefore necessary to remove the naphthenic constituents and wax from the oil stock by suitable refining processes.

Separation of the naphthenic and paraffinic constituents is usually brought about by the use of selective solvents. Wax is removed by cooling and filtering or centrifuging after the addition of a solvent to reduce oil viscosity at low filtering temperatures.

Research carried out in the department of oil engineering and refining, of this university, under the direction of Prof. A. W. Nash and T. G. Hunter, in connection with the above solvent refining processes, has been directed towards the fundamental principles involved rather than towards the determination of the advantages of one particular solvent or process over another. Research under three main heads is under investigation, namely:

1. The fundamental principles of mass transfer in liquid-liquid systems.
2. Equilibria and computations for solvent extraction processes.
3. Equilibria and computations for solvent dewaxing processes.

In solvent extraction processes the solvent makes intimate contact with the oil thereby extracting the more soluble constituents. The essence of the process is the transference of this soluble portion from the oil stock to the solvent. The fundamental problem involved, therefore, is the transference of matter between two immiscible liquids in intimate contact with each other. Considerable research has been reported on the contacting of a gas with a liquid, but apart from that carried out at the Birmingham University oil engineering and refining department, there appears to be nothing reported on mass transfer between two liquids.

Problems connected with the transference of matter between two liquids are best explained by assuming the existence of two resistance films on either side of the interface between the two liquids. The total resistance to mass transfer is equal to the sum of the film resistances which are dependent upon the dynamical contions of flow prevailing in the system. Transference across the films can only take place by diffusion. The rate of extraction, on the basis of the two-film theory, has been shown to be dependent on the magnitude of the dimensionless group known as

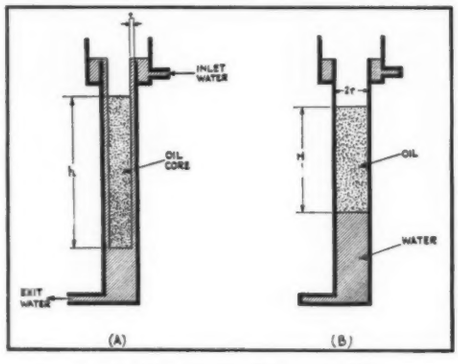

Fig. 1—Arrangement of apparatus

the Reynolds number. Hydrodynamical investigations of fluids in pipes have shown that the magnitude of this group determines the type of flow (streamline or turbulent) prevailing. It is obvious therefore, that if any fluid system is to be used for investigating mass transfer phenomena the hydrodynamical properties of such a system should be available.

Mass transfer investigations at the oil engineering and refining department have been carried out in a double liquid wetted wall system, the transfer of phenol between kerosene and water, being used to examine the fundamentals involved in the transfer processes. The first liquid (water) flowed over the upper inner edge of a vertical cylindrical tube or tower and fell in the form of a film covering the walls of the tube. The second liquid (kerosene) immiscible with the first and containing phenol passed up the center of the tower counter-currently to the first, the phenol being extracted from the kerosene by the counter-current water flow.

The dynamic properties of the system were first investigated in order to determine the type of flow prevailing. This necessitated the measurement of the wall film liquid thickness under various conditions.

The arrangement used is shown in Figure 1. A glass tower, with a constant internal diameter of 2.280 cms., supported vertically, constituted the extraction tower. Water was introduced into the vessel attached to the top of the tower so that it flowed over the upper inner edge of the tower and down the walls. The rate of flow of water into the top of the tower was measured by means of an inclined gauge orifice flowmeter. The water exit line at the foot of the tower was fitted with a valve so that the level of water in the tower could be controlled. Kerosene was then introduced into the center of the tower, by way of a tube from the bottom. After having introduced a sufficiently long column of kerosene the apparatus had the appearance shown in Figure 1A. The height of the kerosene column (h) was measured on a scale attached to the side of the tower at a known constant water rate. The inlet and exit water were then cut off simultaneously so that the water film drained down the walls and the drainings together with the kerosene settled down into the position shown in Figure 1B, where the height of the kerosene column has now been reduced to H. Since the volume of kerosene remained constant throughout, the film thickness t was easily calculated from the values of h, H and the diameter of the tube (2r) for each particular rate of water flow.

The effect of a moving kerosene core on the water film thickness was also examined. The kerosene core was made to move slowly upwards by partially closing the exit water line so that the water level at the bottom of the tower rose, thereby pushing the kerosene core upwards by displacement. This method necessitated measuring the height of a moving kerosene core. This was accomplished by photographing the kerosene column together with the scale attached to the side of the tower. The height of the column was then read directly from an enlarged photographic print. The nature of

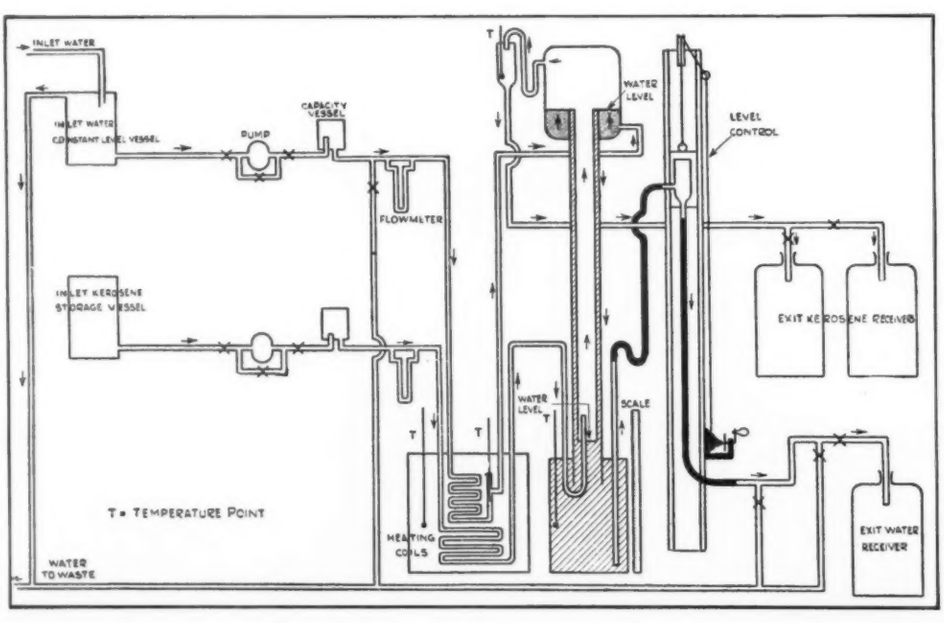

Fig. 2—Equipment used to carry out extractions

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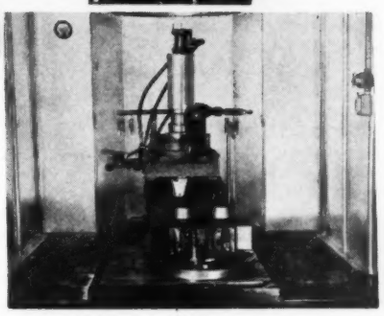

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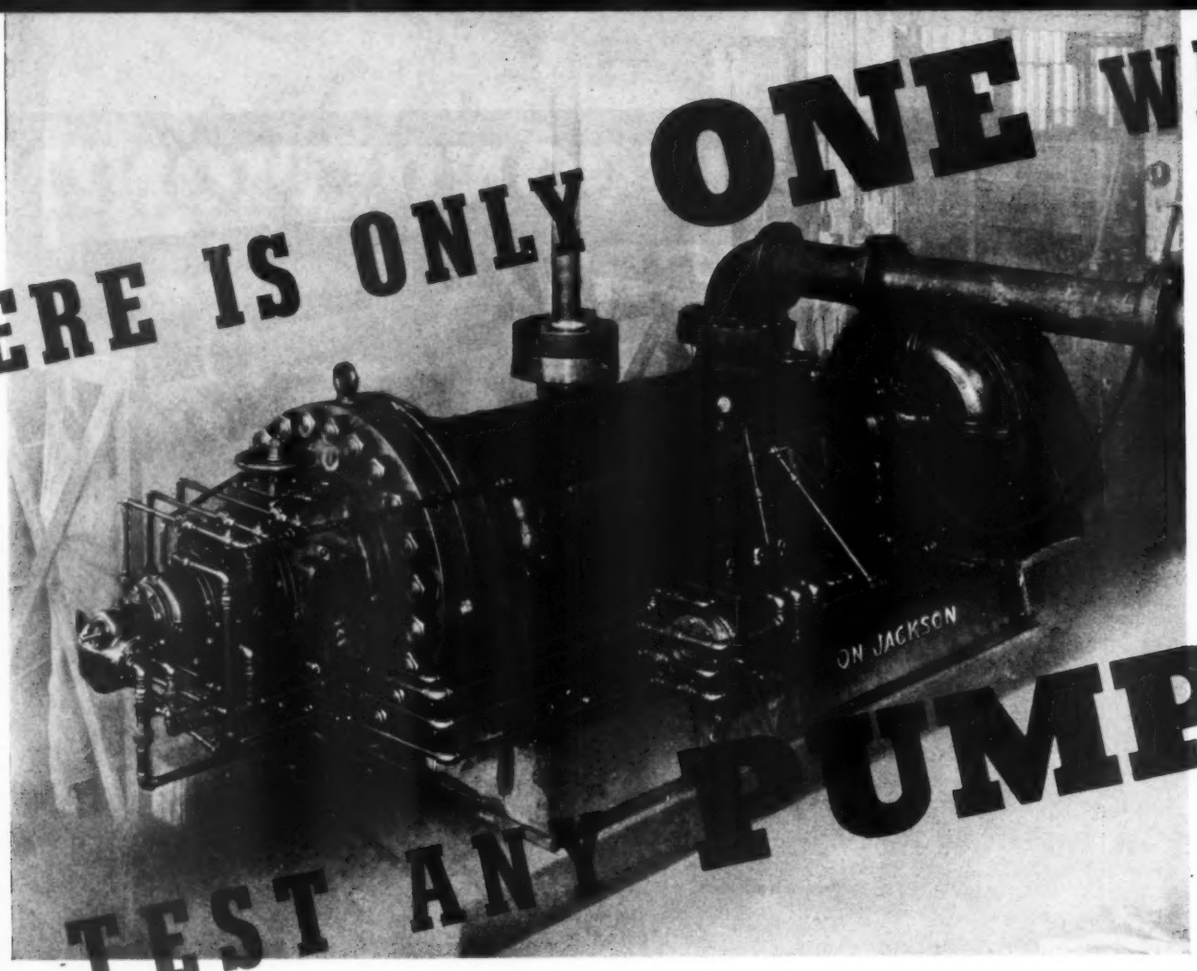

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the core liquid was varied and a series of runs were obtained using stationary core liquids of varying densities and viscosities. The densities of the liquids used varied from 0.79 to 0.97 gms. per cc. and the viscosities from 1.08 to 4.300 centipoises. The results of these investigations have been published[1, 2] in detail and were

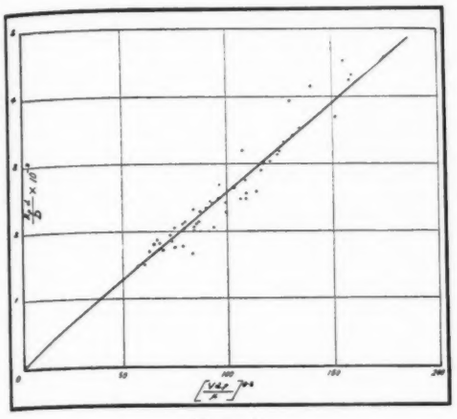


Figure 3

finally correlated by plotting the friction factor $f = 2gm^3 p_f^2/W^2$ against the function:

$$Re^1 = (4W/\mu_f)\ (p_f - p_c)/p_c,$$

namely Reynolds number multiplied by a factor expressing the relative differences in densities of the two fluids, where m is the thickness of the water film, W the mass velocity of water per unit time per unit tower perimeter, μ_f the viscosity of the film liquid and p_f, p_c the densities of the film and core liquids respectively. It was found, for sufficiently low values or Re^1, that $f = K/Re^1$ where K is a constant, dependent on the viscosity of the core liquid. The value of K varied between 24, which is the theoretical value of a free film surface, and 96 which is the theoretical value for a stationary film surface. The limiting theoretical values for the ratio of interfacial velocity to average velocity of film liquid vary from 1.5 to 0, and of the systems examined were found to vary from 1.458 for a kerosene core to 0.106 for a very viscous lubricating oil core. In each case as the water flow was increased a point was found where deviations from the straight line relation $f = K/Re^1$ set in. This occurred at the point where interfacial waves developed and turbulent flow began. This point of deviation was peculiar to each system and occurred at very much lower values of the Reynolds number than that found when using air as the core fluid. It would appear from these results that turbulence in the counter-current liquid-liquid systems depends upon the properties of both liquids.

Extraction experiments were next carried out using the apparatus[3] shown in Figure 2. This consisted essentially of a vertical glass tower 2.531 cms. internal diameter. Inlet water was drawn from a constant level tank, passed through a flowmeter and coil immersed in a water bath, and then passed to the top of the tower where it overflowed down the walls. Kerosene, containing a known amount of phenol, was pumped through a flowmeter and another coil immersed in the same water bath and then entered the bottom of the tower, flowed up the center, out at the top and into the kerosene receivers. The water level at the bottom of the tower was controlled by means of the device shown in Figure 2. When the system was running steadily the exit water and exit kerosene were diverted into receivers. The contents of the receivers were then thoroughly shaken in a special cradle and a sample taken for analysis of phenol content from which a weight balance of phenol over each run was obtained. Four series of results at varying kerosene rates, water rates and temperatures were obtained. From the data previously collected[2] the thickness of the water film for each series of runs was computed. Hence the diameter and height of the kerosene core were known and the interfacial area between the water and kerosene phases could be calculated. The amount of phenol transferred from the kerosene phase to the water phase in unit time is the product of the interfacial area, the concentration difference between the two phases and an overall extraction coefficient. Knowing the phenol concentration (f_i and f_o) in the terminal liquid streams from the tower the mean concentration difference (F) may be evaluated[6] by the expression:

$$F = (f_i - f_o)/\log_e\ (f_i/f_o) \qquad (1)$$

Assuming that the overall resistance to mass transfer (i.e. the reciprocal of the overall extraction coefficient) is the sum of the two individual film resistences, then

$$1/K_p = 1/k_p + 1/Hk_w \qquad (2)$$

where K_p is the overall extraction coefficient, k_p the extraction coefficient across the kerosene film, k_w the extraction coefficient across the water film, and H the distribution coefficient of phenol between water and kerosene. Such a formula would be analogous to those for heat transfer through bodies in series and for mass transfer in gases. But

$$k_p = D/x \qquad (3)$$

where

D = diffusion coefficient of mass transfer of phenol in kerosene.

x = effective thickness of the kerosene film.

This effective film thickness is unknown and dependent on the physical and dynamical properties of the fluids, and by dimensional similarity

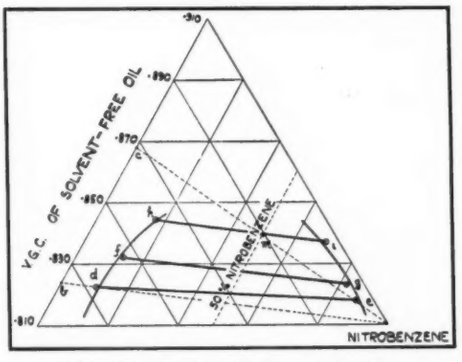


Fig. 4—Typical equilibrium relationships

the divest relationship of equation (4) can be obtained:

$$k_p d/D = a\ (Vdp/\mu)^m\ (\mu/Dp)^n \qquad (4)$$

where V, p, μ are the velocity, density and viscosity of the kerosene, d the diameter of the kerosene core and a, m, n are constants.

From the results obtained the values of the overall mass transfer coefficient K_p were calculated in each case and the function $D/K_p d$ plotted against the function $(\mu/Vdp)^{0.8}$. These plots produced four parallel straight lines for each series of runs from which the following deductions were made:

(a) Since the lines were straight, 0.8 was the correct value for the index of the function μ/Vdp.

(b) Since lines representing the same rate of water flow but at different temperatures were parallel, the function μ/Dp, which varies only with temperature, does not enter into the correlation for the kerosene film transfer coefficient.

(c) Since the lines representing series of runs at different water rates but at the same temperature were parallel, the variation of the water rate had no effect on the kerosene individual film transfer coefficient. Hence the total resistance to transfer can be considered to be made up of two individual film resistances each dependent upon the dynamical conditions and physical properties of the liquid comprising that film.

The individual water film resistance in the four series of runs, easily obtained by calculation, was now subtracted from the overall resistance in each of the runs, thereby obtaining the individual kerosene film resistance. The function $k_p d/D$ was then calculated for each run.

This function was then plotted against the function $(Vdp/\mu)^{0.8}$ giving the straight line shown in Figure 3. This line can be represented by the equation:

$$k_p d/D = 28.5\ (Vdp/\mu)^{0.8} \qquad (5)$$

Equation (5) is the equation correlating the kerosene film resistance with the physical and dynamical properties of the kerosene.

This research has shown, therefore, that mass transfer between two liquids can be treated in the same way as mass transfer between a gas and a liquid. It has shown also that the overall resistance to mass transfer in a liquid-liquid system can be considered as made up of two individual film resistances each dependent on the physical and dynamical properties prevailing in the two liquids.

EQUILIBRIA AND COMPUTATIONS FOR SOLVENT EXTRACTION PROCESSES

The fundamental aspects of mass transfer in solvent extraction processes having been examined, attention was next directed towards some method of forecasting quantitatively the results obtained in the refining of petroleum products by solvent extraction. Graphical representation of equilibria relationships in an oil-solvent system were first investigated and a satisfactory method of representing such equilibria on triangular coordinates was devised.[8] Mathematical properties of such triangular diagrams were then investigated and satisfactory computation methods based on such diagrams were evolved for batch, multiple and counter-current extraction processes applied to a simple three-component system.[7] These graphical methods were then applied successfully to the complex case of an oil solvent system,[5, 9] a short summary of this last aspect of the work only being given here.

Where solvent extraction is employed for the removal of undesirable constituents from petroleum products, such as the extraction of aromatics from kerosene by liquid sulfur dioxide and the refining of lubricating oils by selective solvents, the equilibria involved cannot be represented exactly by any simple means. Exact representation could only be obtained by the use of complex methods involving a comprehensive knowledge of the constituents of such products. However, the problem is simplified by our ignorance of the chemical nature of petroleum products, and equilibria characterization on the following lines leads to satisfactory solution.

In the solvent refining of an oil, the solvent tends to split the oil into two fractions, soluble and less soluble, possessing different physical characteristics. These two fractions do not represent a sharp separation of the oil into purely soluble and less soluble constituents, but are mixtures of both. In certain special cases the nature of the soluble and less soluble constituents may be known, as, for example, in the refining of kerosene where the more soluble constituents are aromatic hydrocar-

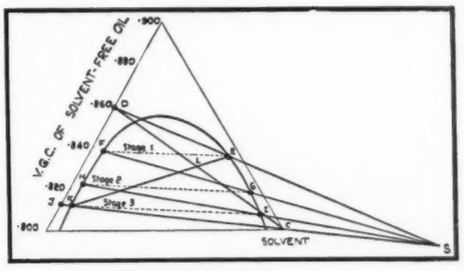
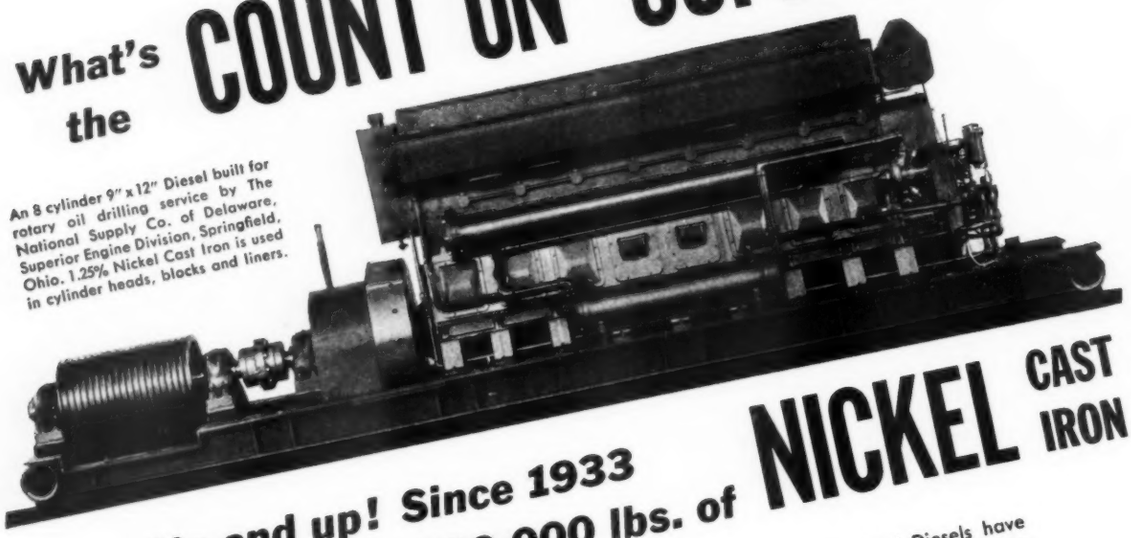


Figure 5

bons and the less soluble nonaromatic. In such a case, where the amounts of aromatic and nonaromatic hydrocarbons are readily determined by analysis, then, the oil may be considered as a simple two-component system, the two components being each complex mixtures of aromatic and nonaromatic hydrocarbons, respectively. The resulting

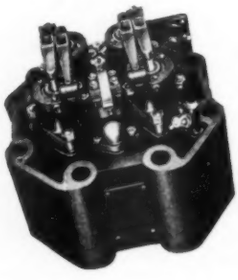
What's the COUNT ON "SUPERIORS"?



An 8 cylinder 9" x 12" Diesel built for rotary oil drilling service by The National Supply Co. of Delaware, Superior Engine Division, Springfield, Ohio. 1.25% Nickel Cast Iron is used in cylinder heads, blocks and liners.

Up and up! Since 1933 they've used 14,000,000 lbs. of NICKEL CAST IRON

THREE REASONS WHY



The cylinder head is a casting containing 1% Nickel. The liner, of a Nickel-chromium-molybdenum mixture, has a tensile strength of approximately 50,000 p.s.i. The piston contains from 1.50% to 1.75% Nickel.

In many fields, users of "Superior" Diesels have learned that they can be counted on. Counted on for a steady flow of power, able to rise above sudden stress from emergency load. And counted on to deliver that power economically.

In a Carolina textile mill, for instance, an 810 H. P. "Superior" Diesel is running 132 hours a week, at 90% capacity. This job requires uniform and dependable speed under varying loads, or quality suffers. And shut-downs would lead to spoiled goods.

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The engine illustrated above works in the oil field . . . where interruptions cost too much to risk them. Superior takes no chances: they use cast irons alloyed with small amounts of Nickel throughout the entire engine. For pistons, cylinder liners, blocks and heads, varying amounts of Nickel, from 1% to 1.75%, give the uniform grain structure, improved strength and toughness and resistance to wear and heat.

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THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.

oil-solvent system may then be treated as a simple ternary system, and equilibrium relations represented on triangular coordinates in terms of solvent, aromatics, and nonaromatics. Cases where the oil can be analyzed in terms of two groups of constituents are, however, relatively rare and unimportant, compared with cases where such analysis is impossible.

The chemical composition and composition changes of a lubricating oil stock, however, may be determined to a certain extent by the use of physical properties as, for example, the viscosity-gravity constant. Therefore with our present state of knowledge, in order to represent the equilibrium relations in an oil-solvent system, it is only necessary to record by some suitable means the following information:

1. Amounts of the two phases in equilibrium.
2. Amount of solvent in each phase at equilibrium.
3. A physical property of the oil present in each phase at equilibrium.

Items (2) and (3) of this information can be recorded by a single point on a triangular graph of which one vertex represents pure solvent and one side, opposite to this vertex, is scaled into units representing the required physical property of the solvent-free oil.[6, 8, 9] Typical equilibrium relationships resulting between a lubricating oil and nitrobenzene at 10° C. are plotted on the triangular graph, Figure 4. The V.G.C. of the solvent-free oil in a certain raffinate layer is given by point b on this diagram. The actual raffinate layer from which this oil was separated contained 10.7 per cent of solvent, nitrobenzene. Now, if raffinate oil of this V.G.C. were mixed with an amount of nitrobenzene such that the total mixture contained 10.7 per cent of nitrobenzene, we should get the actual raffinate layer obtained. Therefore by joining b to the apex of the triangle representing 100 per cent of nitrobenzene and locating the point on this line where the nitrobenzene content is 10.7 per cent, the point d representing the composition of the raffinate layer is obtained. This may be shown in another way. By starting with the raffinate layer of composition d and removing all the solvent present, the point b on the diagram would be obtained, which is solvent-free oil of V.G.C. 0.824. The composition of the various raffinate and extract layers is therefore easily ascertained, and is indicated on this diagram by the points d, f, h and e, g, i. The compositions of a raffinate and an extract layer in equilibrium are given, for example, by points d and e. These two solutions are conjugate, and hence may be joined by the tie-line de. The completed isothermal binodial curve and tie-lines shown on the diagram then represent the equilibrium relations for this lubricating oil-nitrobenzene system at 10° C.

In obtaining the points h and i equal volumes of nitrobenzene and oil were employed, so that the resultant mixture contained 50 per cent of nitrobenzene, and its composition would be represented by the intersection of the line joining the V.G.C. of the stock, point c in the figure, to the 100 per cent nitrobenzene apex and the line representing 50 per cent of nitrobenzene—namely, point m in Figure 4. This mixture, however, can only exist as two stable phases in equilibrium the composition h and i of which is given by the tie-line passing through m. The amounts of the raffinate phase h and the extract phase i are then proportional to the lengths of the two lines mi and mh. Therefore, knowing the volumes of solvent and oil used originally, the volumes of the two phases formed can be calculated from this relationship. Further, since the volume per cent of solvent in each phase can be read from the figure, the actual volume of solvent-free oil in each phase can also be calculated. Such a diagram, therefore, gives a complete representation of all essential equilibrium relationships. In constructing these diagrams the scale employed for the physical property of the solvent-free oil can be chosen to give a suitably sized binodial curve. The actual terminal values finally selected become, by the nature of the diagram, equivalent to the physical property of the soluble and insoluble components of the oil. The physical property chosen for the construction of the equilibrium diagram is also required by the nature of the diagram to be additive.

Such a diagram can best be constructed from experimental results obtained by the single-stage batch extraction of an oil with different volumes of solvent, but care must be exercised to insure that the two liquid phases are in equilibrium.

In a heterogeneous system undergoing agitation, two unstable phases may coexist which are approaching equilibrium with each other. In this case the points representing the composition of each phase at any instant during approach to equilibrium must lie on the binodial curve, since this curve represents the compositions of all possible heterogeneous solutions, but the tie-line joining two such points would not, of course, represent stable equilibrium. The composition of any phase from a counter-current extraction process would then presumably lie on the binodial curve, even if equilibrium was not attained in each extraction stage.

The triangular equilibrium diagram may be employed as basis for computation in complex oil-solvent systems.[6, 8, 9]

Consider a lubricating oil stock contacted counter-currently in an isothermal system of n stages with a solvent which is refining the stock by selective extraction where the equilibrium between the stock and the solvent is represented by a single binodial curve of the form shown in Figure 5. Let the amount of stock to be treated entering the system per unit time be P and the amount of raffinate and solvent phases per unit time leaving any stage be P and W, respectively, each combined with a suffix describing the number of the stage such raffinate, solvent, or extract phase has just left.

Computations for such a counter-current extraction process normally involve a knowledge of the value of some physical property of the stock to be treated, the ratio of solvent to stock employed, $(W_n + 1)/P_o$, and the value of that physical property of the refined oil desired. Given such data, it is usually required to calculate at fixed working conditions:

1. The yield of refined oil.
2. The amount of solvent associated with the refined oil.
3. The amount of extract.
4. The amount of solvent in the extract and yield of solvent-free extract oil.
5. The value of a physical property of the solvent-free extract oil.
6. The number of ideal extraction stages required to give the desired refined oil.

In Figure 5 let points D and J represent the V.G.C. of the treated stock and the desired raffinate, respectively, and the point C the composition of the solvent employed.

The amount of solvent associated with the raffinate is obtained from the point K, where the line joining J and C intersects the binodial curve.

Taking a material balance over the entire system, we have:

$$P_o + W_{n+1} = P_n + W_1 \quad (6)$$

That is, the complex obtained by mixing the solvent and stock to be treated can also be obtained by mixing the raffinate and extract streams from the system. It follows that the line joining the two points representing the composition of the stock and solvent streams must intersect the line joining the points representing the composition of the raffinate and extract streams at a point L. Therefore, by joining points D and C in Figure 4, and dividing the line DC in the ratio $(W_n + 1)/P_o$, we locate the point L, so that

$$DL/LC = (W_n + 1)/P_o$$

By joining point K and L and producing KL to intersect the binodial curve we obtain point E, which represents the composition of the extract, and the ratio $KL/LE = W_1/P_n$.

In an ideal extraction stage, which is the type of stage being considered here, the extract phase leaving a stage is by definition in equilibrium with the raffinate phase leaving the same stage. The composition of the raffinate phase P_1 leaving the first stage is therefore located by the tie-line passing through E, and is the point F in Figure 5. The point representing the composition of the extract phase W_2 leaving stage 2 must now be located. It has been shown[7] that the point S in Figure 4 must lie on the line passing through the points D and E, and can be found by the relation $DE/ES = (P_o - W_1)/P_o$.

The composition of the extract phase W_2 leaving stage 2 can therefore be obtained from the intersection of the line FS with the binodial at G. Drawing the tie-line through G completes the representation of stage 2. Further construction on these lines enables the number of ideal stages re-

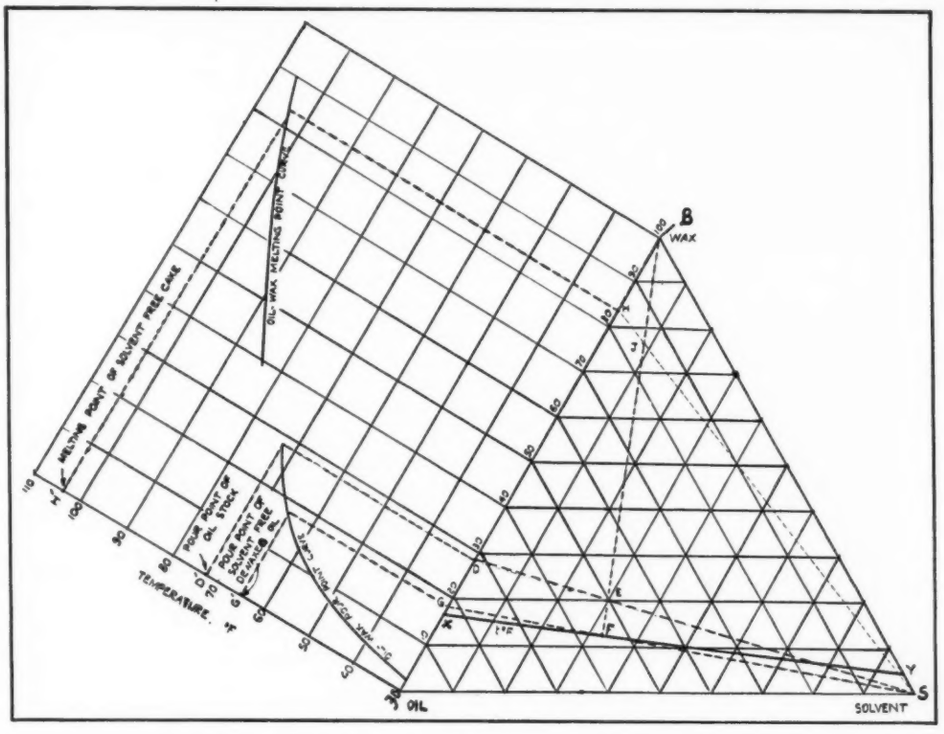

Fig. 6—Equilibrium at a given temperature in oil wax system

quired (three in the case of Figure 5) to be calculated. Should an auxiliary line passing through point S coincide with a tie-line, no further extraction is possible with the conditions employed.

Experimental and calculated results, calculated using the above methods, from both multiple and counter-current extraction processes refining different lubricating oil stocks with nitrobenzene were compared.[6, 9] The yields of solvent-free raffinate and extract oils, the volume per cent of solvent in both layers, and the V.G.C. of the extract were calculated for the multiple and counter-current extraction of different stocks with different volumes of solvent to obtain a solvent-free raffinate oil of given V.G.C. The agreement between actual experimental results was most satisfactory the maximum deviation obtained being of the order of 10 per cent. These methods have now been adopted by many oil companies both in Great Britain and the United States.

EQUILIBRIA AND COMPUTATIONS FOR SOLVENT DEWAXING PROCESSES

Dewaxing of lubricating oil stocks is carried out in order to lower the pourpoint of the oil by reducing its wax content. This is done by cooling down the stock to temperatures where the wax is less soluble in the oil and is precipitated. It is not possible, however, to separate the wax from the oil by filtration or centrifuging unless the viscosity of the wax-oil mixture is reduced by the addition of the solvent or diluent which is recovered from the dewaxed oil by distillation. The solvent, however, may dissolve the wax to some extent and hence the greater the solvent-oil ratio employed the higher will be the pourpoint of the dewaxed oil obtained by dewaxing at a given temperature. Alternatively with this type of solvent in order to obtain the same pourpoint of dewaxed oil the temperature of dewaxing must be decreased as the solvent-oil ratio increases. No method was available of predicting the effect of solvent-oil ratio on the pourpoint of the dewaxed oil, and research was therefore carried out at the oil engineering and refining department,[10] in order to devise some method of dewaxing computations which would enable the effect of solvent-oil ratio, dewaxing temperature, etc., to be predicted.

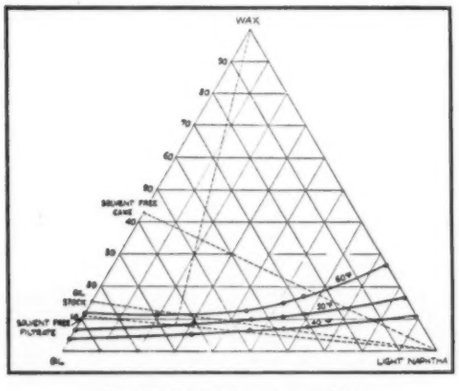

Fig. 7—Equilibrium in naphtha

Triangular coordinates employed so successfully in the solution of the solvent extraction problem were again used to represent equilibria. In Figure 6 each vertex of the triangle represents pure oil, pure wax and pure solvent respectively. Any point within the triangle then represents the composition of a definite oil-wax solvent mixture. A rectangular coordinate graph is attached to the oil-wax side of the triangle and on this the pourpoint and melting point curves for known oil-wax mixtures are plotted. Hence the percentage wax in any oil-wax mixture can be determined by means of its pourpoint or melting point.

In Figure 6, XY represents equilibrium, at a temperature t° F., in a given oil-wax-solvent system. Any composition of an oil-wax-solvent mixture represented by a point in the triangular graph below the line XY is wholly liquid, while any composition represented by a point above this line must exist as two phases, namely, solid and liquid. The point representing the composition of the solid phase, wax, is given by the wax apex of the triangle. The composition of the liquid phase is given by the point of intersection of the equilibrium line XY with the straight line drawn to pass through the wax apex and through the point representing the composition of the original oil-wax-solvent mixture. If the pourpoint of the oil-wax stock to be dewaxed is represented by D^1 then the percentage of wax in the mixture is given by D. On adding solvent at t° F. to this mixture also

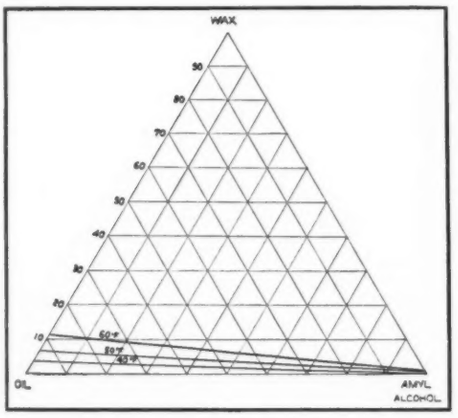

Fig. 8—Equilibrium in amyl-alcohol

at t° F. the composition changes from the point D to the point E where the solvent-oil ratio is given by ED/ES. The mixture of solvent and stock existing as two phases at the dewaxing temperature t° F. is now filtered. The composition of the resultant filtrate is given by point F, obtained by producing BE to cut XY at F. On distilling off the solvent the composition of the filtrate changes from point F to point G and is found by producing SF. The pourpoint of the dewaxed oil is therefore represented by G^1.

The cake consists of solid wax with mechanically entrained oil and solvent. If when the solvent is distilled off the melting point of the resulting oil-wax mixture is found to be H^1, then its composition must be represented by H. The composition of the cake must then be represented by point J, the junction of the lines HS and FB. The mixture of composition E, on being filtered at t° F., was therefore separated into two portions, cake and filtrate, whose compositions are represented by the points F and J. If the length of the line JF represents the weight of oil-wax-solvent mixture charged to the filters, then the length JE represents the yield of filtrate and the length EF the yield of cake. After distilling off the solvent the weight of dewaxed oil is given by (JE/JF) (FS/GF)x weight of mixture charged, and similarly the weight of the oil-wax-cake is given by (EF/JF) (JS/HJ)X weight of mixture charged. From this type of representation, therefore, it is possible to forecast the yield of cake and dewaxed oil as well as the pourpoint of the dewaxed oil.

This procedure was tested using a second cooled blue oil, a wax of melting point 108° F., and various solvents. The pourpoint and melting point curves for mixtures of this oil and wax were determined to the nearest 1° F. Using light naphtha as solvent the equilibrium lines in Figure 7 at temperatures of 40°, 50° and 60° F. were determined by observing the cloud points of mixtures obtained by adding known amounts of wax to mixtures of known oil-solvent composition. Having obtained these equilibrium lines, dewaxing experiments were carried out at these temperatures. In all cases the observed pourpoints did not differ from the calculated pourpoints by more than 1° F., while similar close agreement was obtained between the observed and calculated yields of cake and dewaxed oil.

With other solvents, however, the equilibrium lines could not be obtained by cloud point methods, due to the differential solubility of the wax, the higher melting point waxes present being precipitated first before the system had attained equilibrium with all the waxy constituents.

Equilibrium lines for other solvents examined, viz., amyl alcohol and methyl ethyl ketone, etc., were obtained by small laboratory scale dewaxing experiments. In all cases examined, one of which, the amyl alcohol equilibrium, is shown in Figure 8, the equilibrium lines were found to be perfectly straight; hence only two points are required for the construction of an equilibrium line.

By means of the construction shown in Figure 6, therefore, it is possible to predict the pourpoint and yield of dewaxed oil which would be obtained from a given stock using a given solvent-oil ratio and dewaxing temperature. Alternatively, to obtain an oil of given pourpoint it is possible to determine from the graph the temperature of refrigeration required for any particular solvent-oil ratio.

It will be seen from the above that research at the Birmingham University oil engineering and refining department has been concentrated mainly upon solvent refining problems. The results of the work to date may be summarized briefly as follows:

1. Initial investigation of hydrodynamical properties of counter-current liquid-liquid systems.
2. Successful classification of certain fundamental aspects of mass transfer in solvent extraction processes.
3. The establishment of a simple graphical method for representing complex equilibrium relationships in a solvent-oil system.
4. The production of a method for calculating the results to be expected from a solvent extraction refining process.
5. The establishment of a simple graphical method for representing equilibrium relationships in an oil-wax-solvent system.
6. The production of a method for calculating the results to be expected from a solvent dewaxing process.

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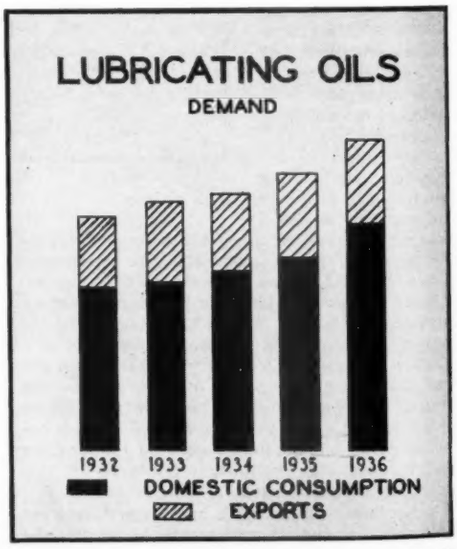

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1935	19,661,000	8,499,000	28,160,000
1934	18,484,000	7,660,000	26,144,000
1933	17,152,000	8,218,000	25,370,000
1932	16,614,000	6,851,000	23,465,000

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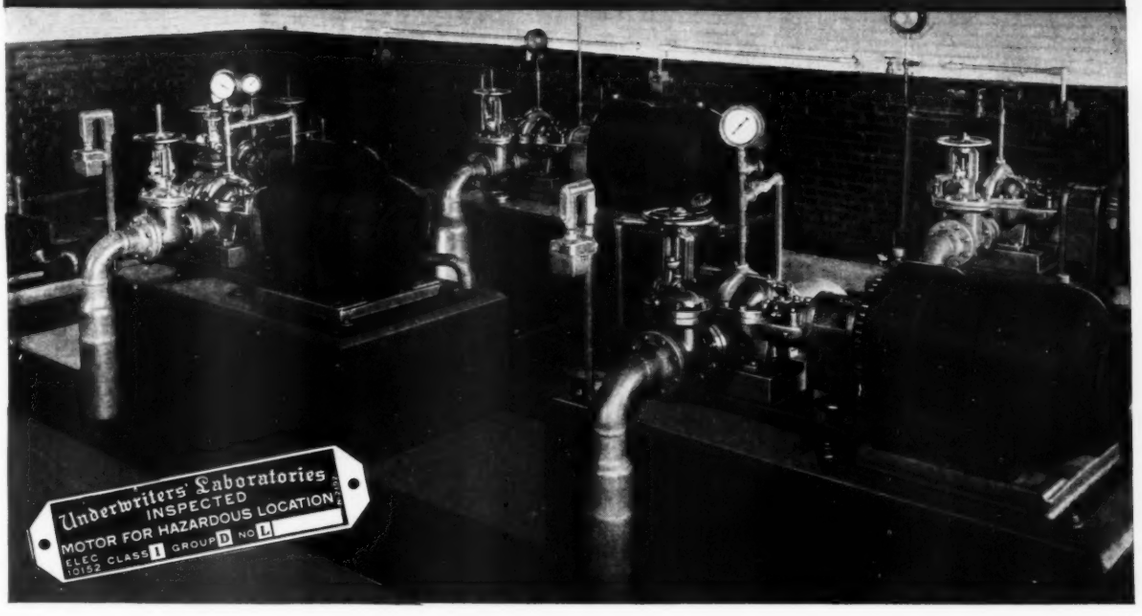

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Kendall Operates New Solvent Unit

By E. E. BOWN
Kendall Refining Co.

The fourth propane dewaxing and deresining plant constructed in this country and the first to operate on Pennsylvania charging stock is now in operation at the Kendall Refining Co.'s refinery in Bradford, Pa.

The unit, designed and constructed by the M. W. Kellogg Co., has a capacity of 1,100 bbls. per day. It is designed on a basis of steam balance, i.e., all exhaust steam from the pumps and compressors is used in the recovery system. Both cylinder stock and viscous neutral are to be dewaxed and cylinder stock deresined, but so far the only charge has been cylinder stock.

A comparison of inspection tests on the charge and product follow:

	Charge	Product
Viscosity at 210° F.	165	150
O.D. Color	2,600	700
Gravity	25.5	25.8
Viscosity of resins at 210° F.		11,500 to 13,500

An O.D. color of 700 corresponds to an N.P.A. color slightly dark of 8. The pourpoint, A.S.T.M. is below zero.

The Kendall plant differs slightly in operation from any of the plants previously constructed. The process flow follows somewhat closely the flow in the plant of the Shell Petroleum Corp. at Wood River, Ill., although deresining follows dewaxing in the Kendall plant, whereas deasphalting precedes dewaxing in the Shell plant.

The wax-bearing charging stock is mixed with propane in the ratio of one to two and one-half. This proportion is extended to one to three during chilling since constant volume is maintained in the chiller.

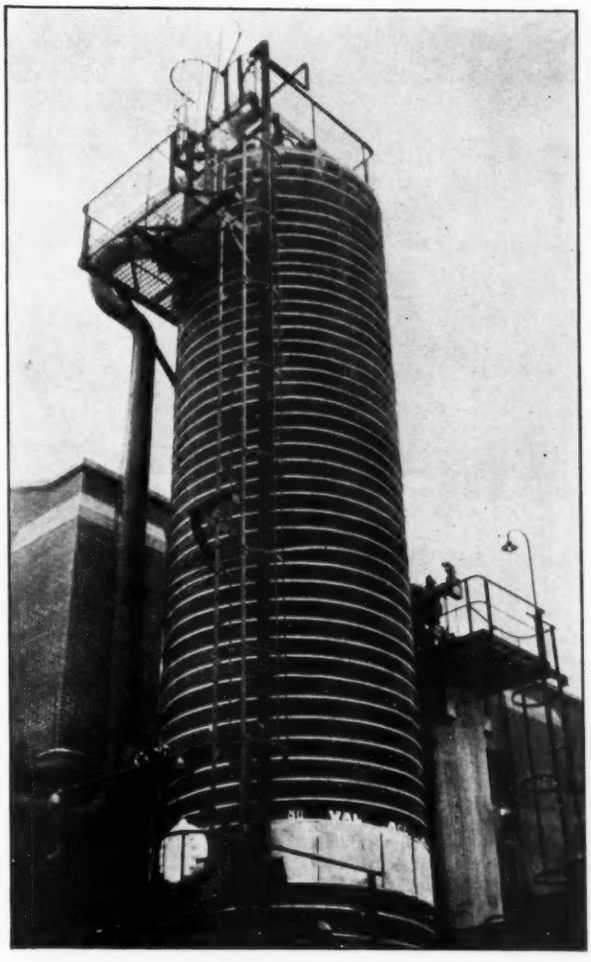
The primary mixture is heated to temperatures sufficiently high to secure complete solution. It is then cooled by exchange with dewaxed solution and charged into a surge tank preparatory to chilling.

Batch chilling is employed in preference to continuous chilling to make use of the self-refrigerating properties of propane rather than to use indirect refrigeration. Due to the variations in suction pressure during the chilling operation, it is necessary to employ a compressor having constant r.p.m. with variable displacement to obtain essentially uniform horsepower requirements. The two-stage chilling compressor is driven by a 500-horsepower synchronous motor and has a capacity of 3,000,000 feet of propane per day.

The chilling cycle requires two hours. Two chillers are employed to provide continuous operation of the compressor. After a batch has been chilled, it is transferred to a filter feed surge-tank by means of pressure differential and the emptied chiller is then ready for charging with a new batch of solution.

Separation of precipitated wax from the chilled solution is effected by two continuous rotary pressure filters. These filters operate with a pressure differential of approximately 3 to 5 pounds, the pressure differential being secured by the use of propane and a steam-driven, double-acting, blow-gas compressor.

Wax is removed from the filter cloth by means of a back blow of propane gas and a scraper blade which deposits the wax into a conveyor trough.



Insulated feed-tank for filters

The wax is then pumped through exchangers to a still having high-pressure and low-pressure sections for the complete removal of propane.

The dewaxed solution flows from the filters into a surge tank from which it is pumped continuously through exchangers and heaters to the settlers. The mix ratio is advanced to 10 volumes of propane to one volume of oil prior to entering the inclined settlers in order to secure effective separation of the resins and colored materials.

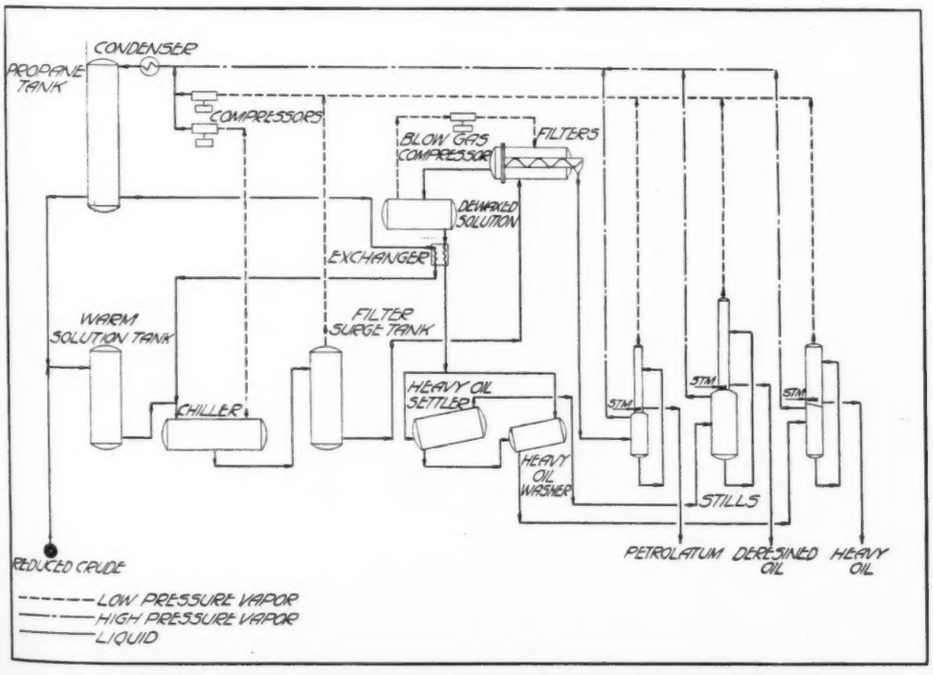
Precipitated resins in the settler are pumped onto a washer where entrained oil is recovered and recirculated into the settler. The precipitate which collects in the washer is pumped to a still having high- and low-pressure sections for propane recovery. The resins are being used as fuel although it is believed that a more economic use may be developed later.

The dewaxed, deresined solution flows from the settler through additional exchangers and heaters to a still employing a high-pressure section, an atmospheric flash section and a steam stripping section where the final propane recovery action occurs. Clay filtration, by means of percolation, completes the processing of the dewaxed, deresined oil.

A 200-horsepower, steam driven, variable speed and constant displacement compressor maintains relatively low pressure on the filter feed tank and the dewaxed solution tank and compresses any propane which is recovered in the low-pressure section of the stills.

Operation of the plant is maintained as constant as possible by the use of a large number of flow controlling, temperature controlling, pressure controlling, liquid level controlling, temperature recording and pressure indicating instruments.

E. E. Bown of Bradford, Pa., is manager of the Kendall refinery. The company is headed by Otto Koch with H. H. Greene and Joseph H. Bovaird, vice presidents, and J. Bertram Fisher, secretary. Francis J. Healy is superintendent.



Simplified flow-chart for new propane dewaxing and deresining plant in Kendall refinery

Shell Manufactures 100 Octane Motor Fuels on Large Scale

Employing the latest technic of catalytic organic synthesis on a large scale, the principal refineries of the Shell organization have achieved commercial production of 100 octane aviation fuel possessing important advantages for modern aircraft. Introduced on the West Coast in 1935, exhaustive tests by the air forces of the United States army and navy established the superiority in operation and performance of this low-lead content highly efficient fuel. Through rapid strides in plant process, production has been extended to several major manufacturing units of Shell.

Parallel with the growth of the aviation industry, designers are ever faced with the demand for greater loads, higher speeds, more efficient operation and increased safety factors. Despite the continual improvement in engine construction, the maximum compression ratio before detonation occurs has proved a barrier to raising the effective power output and fuel economy with commercially available gasolines. By the addition of tetraethyl lead, the threshold of detonation can be extended to substantially higher compression ratios, but the point is reached eventually when valves and spark plugs are affected by the decomposition products of lead compounds. Therefore, further advance in this direction has awaited major improvement in the hydrocarbon base stock.

This has been accomplished by the development of high capacity apparatus for the synthesis of "iso-octane"—2,2,4-trimethylpentane (one of the 18 structural isomers of the normal paraffin hydrocarbon "octane"). Through the work of Dr. Graham Edgar and associates of the Ethyl Gasoline Corp., a large group of data has been accumulated clearly showing that the octane rating of a hydrocarbon is associated directly with molecular structure. The more "centralized" the carbon skeleton, the higher "the antiknock quality." As an example of this type of compound, 2,2,4-trimethylpentane was found to be ideal for the purpose of providing a 100 per cent standard for comparing other hydrocarbons and hydrocarbon fuels, the zero rating being represented by normal heptane. However, at the time the iso-octane and normal heptane scale was put into effect, the cost of the pure hydrocarbons was so large that, even for laboratory use, it was found advantageous to resort to secondary standards prepared at lower cost. It then seemed quite optimistic to anticipate production on large scale of an individual hydrocarbon of centralized molecular structure possessing an outstanding knock rating and satisfactory boiling point. With this situation as the background, the Shell technical organization undertook the synthesis of 2,2,4-trimethylpentane. Rather than using classical laboratory methods involving condensation and substitution reactions with relatively expensive reagents, effective catalytic polymerization methods were employed to produce olefines of high purity for hydrogenation to the desired compound. By this method, it was possible in 1935 to produce iso-octane of purity approaching that of the material used for antiknock testing. In that year, tankcar deliveries were made to the United States army and navy. Since then, this process has been developed further and production of iso-octane extended to several of the larger refineries of the group.

Numerous United States and world speed records have been broken in airplanes using 100-octane aviation gasoline, the major ones being the world's land plane speed record of 352 miles per hour established in 1935; the United States west-east transcontinental record from Burbank to Newark of 7 hours, 28 minutes and 25 seconds or an average speed of 332 miles per hour established in 1937; the land plane and amphibian records from New York to Miami of 5 hours, 46 minutes and 30 seconds and from Miami to Havana in 1 hour and 14 minutes, also the world amphibian record for 100 kilometers at a speed of 210 miles per hour. The latter three records were all established in 1936 in a Seversky amphibian.

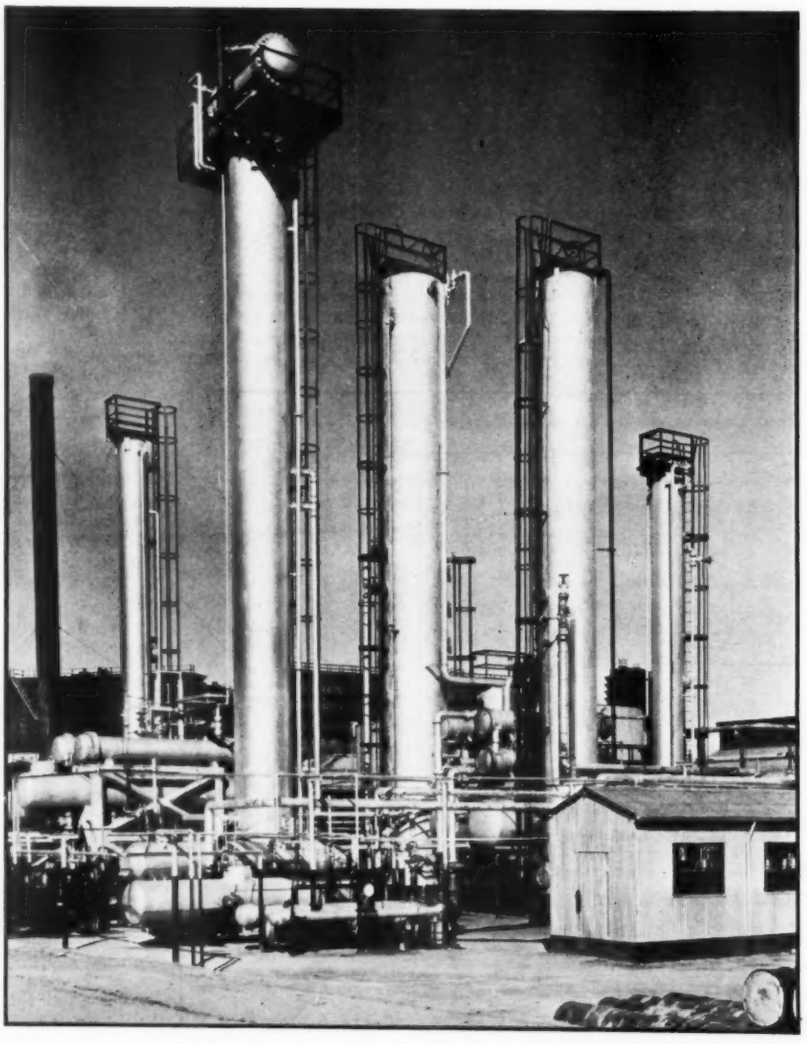
This fuel has attracted the attention of the United States army in particular because of the importance of performance characteristics for combat planes. These data have been published in a report by Lt. Frank D. Klein, covering tests by the power plant section at Wright Field, Dayton, Ohio. The results of these tests may be very briefly summarized as follows, comparing 87- and 100-octane fuel:

1. Lower cylinder head temperature at high power output.
2. Lower specific fuel consumption (over 20 per cent) at constant power output.
3. Greater power output (over 14 per cent) at given specific fuel consumption.
4. Greater payload with reduced fuel load. With changes in engine design to take full advantage of 100-octane fuel, a further improvement in load carrying capacity can be made.

The above tests were made with 500-horsepower engines at 2,200 r.p.m.

Horsepower output during the last several years has increased approximately 33⅓ per cent per unit weight with a corresponding increase in antiknock value of fuels from 73 octane to 87 octane for commercial grades. This increase has been accomplished through the addition of knock suppressors or dopes mixed with regular straightrun aviation gasoline having an initial knock rating of 73 octane as required by leading engine manufacturers. Until the development of 100-octane fuel, the highest octane grade specified was the Air Corps Grade 92, determined by the special army test method, which rates straightrun aviation gasolines slightly better than the A.S.T.M. method ordinarily used to test commercial fuels. When commercial grade 87 and army grade 92 are tested by the same method there is a difference of not more than two octane numbers.

Thus, the future of air transport depends in no small measure upon continued improvement of hydrocarbon fuels. With engines developed to their present degree of efficiency, fuels must be manufactured under strict specifications.



Part of equipment used to make iso-octane in Shell plant

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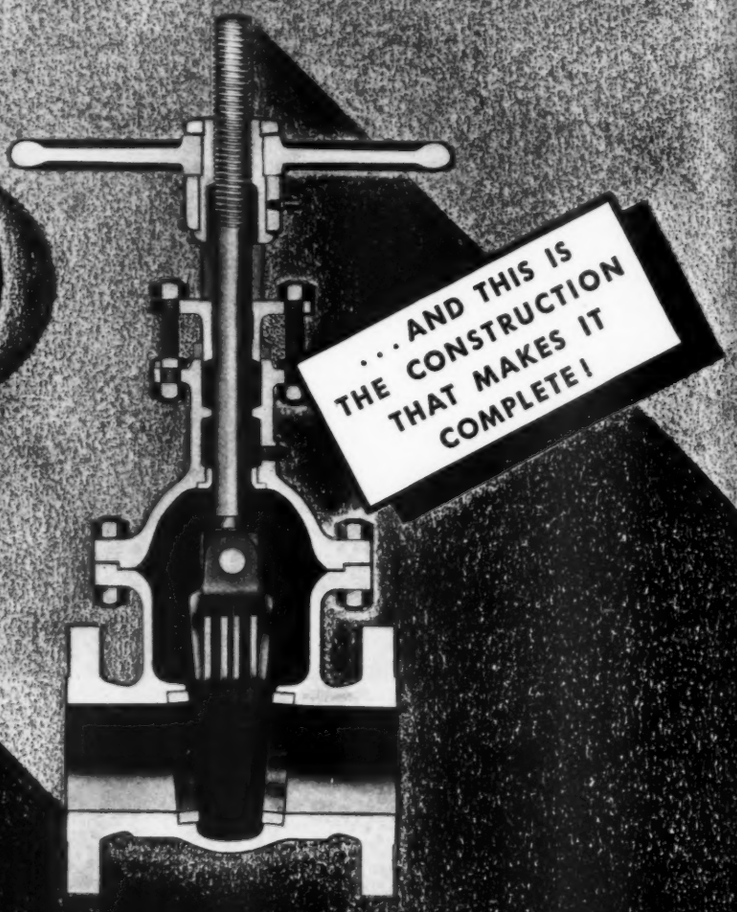
The Inside Story OF VALVE DESIGN



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IMPROVED CAST STEEL GATE VALVE

Road Asphalts Manufactured From Heavy Arkansas Crude

By W. M. CARNEY
Lion Oil Refining Co.

During the past few years the demand for asphalts has increased very rapidly. New products have been made by the use of asphalts, which has materially increased the consumption of asphalt throughout the world. The largest amount of asphalt produced in the United States is used in the construction and maintenance of roads and pavements and in the roofing industry. It is estimated that approximately 60 per cent of the asphalt production is used in the construction of highways and streets, 25 per cent in the roofing industry and the remaining 15 per cent for various purposes, such as waterproofing, acidproofing, thermal insulation, paints, mastics, roofcoating, pipe-line coatings, plastic cements, battery boxes, building paper, rubber compounding, electrical fittings and numerous other uses.

HISTORY

The history of asphalt dates back before the dawn of man and it is known as one of man's oldest construction materials. Skeletons have been found preserved in native asphalt pits and identified by archaeologists as belonging to the Pleistocene or Glacial period, which is said to have ended about 25,000 years ago, or long before the dawn of man. Mummies have been found in recent years which were said to have been 5,000 years old and still in an excellently preserved condition. Some contend that asphalt was used in the construction of Noah's Ark. We have recorded history which shows that asphalt is one of our oldest materials for construction and waterproofing, and we know that it is very resistant to acid, alkalies and weathering conditions.

This paper is to deal with the manufacture of petroleum asphalt for the construction of highways and streets and as a roofing material. The asphalt used centuries ago was, of course, obtained from native asphalt pits. The manufacture of petroleum asphalt began immediately after the discovery of asphaltic crude in California in about the year 1900. Soon afterward it was found that Mexican crude contained a higher percentage of asphalt and was more easily reduced to a hard residue. The process used was the "batch" still steam distillation under atmospheric pressure.

This process was used more successfully to reduce Mexican crude to asphalt because it was necessary only to remove a gas oil in order to produce an asphalt residue. This could be accomplished at comparatively low temperatures and avoid the "cracking" which occurred in the reduction of domestic crudes containing lubricating oil distillates with the higher boiling ranges.

Following the discovery of more domestic asphalt crudes, the production of petroleum asphalt rapidly increased and it was used not only for fluxing native asphalt, but also straight for the construction of pavements and highways. Most of these asphalts were improperly processed and it was only a period of time until construction engineers decided that this type of asphalt was inferior to that which had been produced from Mexican crude. There soon followed specifications which eliminated many asphalts by inserting requirements which improperly refined asphalts could not meet.

It was about the year 1926 which saw the introduction of the pipe still and modern vacuum tower for the reduction of crude or topped crude to paving grades of asphalts. This allows asphalt to be manufactured from many crudes which otherwise could not be processed to asphalt on account of the high boiling ranges of the intermediate fractions.

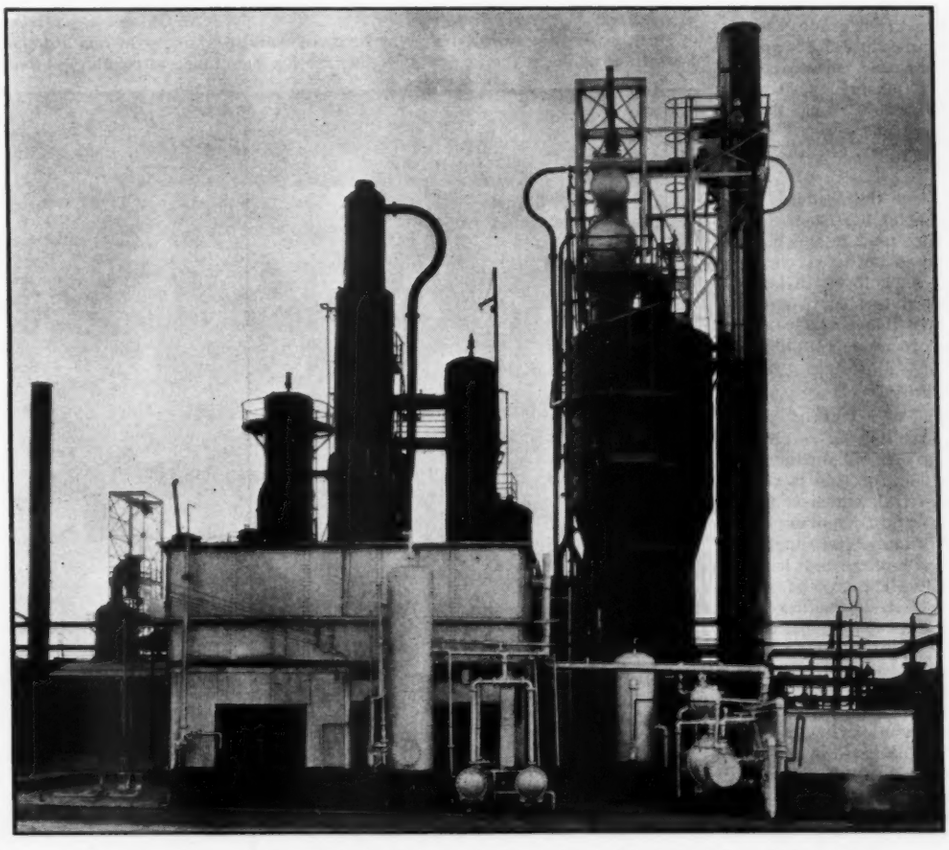
The modern pipestill and vacuum tower is probably the most efficient operation for the reduction of asphalt crude to the various grades of paving asphalts and roofing fluxes. It consists of a furnace for both the atmospheric and vacuum coils, flash tower, atmospheric fractionating tower, vacuum tower, sufficient vacuum equipment for maintaining vacuum on the tower, and the necessary heat exchangers, condensers and tanks.

The furnace for a two-stage distillation unit for the reduction of crude to asphalt consists of a double coil, one of which is used for the atmospheric pressure distillation of lighter fractions (including gas oil) and the other for heating the reduced crude before flashing into the vacuum tower. With the proper arrangement and number of tubes in the heating coils of the furnace, the rate of temperature rise and the temperature subjection can be controlled very accurately.

INTRODUCTION OF CRUDE

In operation, the crude is introduced into the system by passing through heat exchangers and absorbing heat from overhead lube distillate vapors or vacuum tower bottoms, which may be either asphalt or fluxing oil. The charge then goes to the first coil of the furnace where it is heated to the temperature required for the distillation of gasoline and gas oils, after being flashed into the atmospheric pressure fractionating towers. The flash-tower bottoms are then returned by a hot-oil pump to the second coil of the furnace and the temperature is raised sufficiently to support the heat of vaporization required, depending on the asphalt product desired; and flashed into the flash section of the vacuum tower. The overhead product from the vacuum tower is a lube distillate, the viscosity depending on the asphalt product being desired. Asphalt or flux is pumped from the bottom of the vacuum tower, a level being held by a liquid level control.

A reduced pressure is maintained in this tower to facilitate the distillation of lighter fractions at as low temperature as possible, in order to eliminate the decomposition of lubricating oil distillate and asphalt bottoms. Considerable steam is injected into the vacuum tower near the base which assists in vaporizing the lube distillate by reducing the partial pressure of the oil vapors. This process is known as wet vacuum



Vaccum reducing unit in El Dorado, Ark., plant of the Lion Oil Refining Co. used in making asphalt from Smackover crude

distillation and has proven most efficient for the reduction of asphalt crude to the various grades of paving asphalts and roofing fluxes.

The consistency of the asphalt residue is controlled by the temperature reached in the furnace, the amount of vacuum maintained, the reflux added to the vacuum tower and the amount of steam used. This type of operation is very flexible, making it possible to produce any grade of product from the consistency of light flux or binder to the lowest penetration grades of paving asphalt, direct from the vacuum tower.

The reduction of crude to asphalt under low absolute pressures eliminates the necessity for excessive temperatures which cause thermal decomposition and the consequent formation of free carbon. Cracking causes the distintegration of the true bitumen and affects the quality of the asphalt with regard to ductility, adhesiveness and susceptibility to oxidation. The excessive temperatures cause chemical reactions and molecular rearrangements to take place with consequent changes in the physical properties of the oil or asphalt.

The vacuum tower should be large enough to have sufficient fractionating trays to produce a clean lube distillate or heavy gas oil, depending upon the nature of the crude. Good stripping of the distillate in the vacuum tower also increases the yield, as well as the quality of the asphalt. When poor fractionation is obtained it is better to produce a hard asphalt and blend back with a heavy fluxing oil. A light oil would lower the flashpoint and raise the loss from volatilization, with a consequent hardening of volatility residue. The asphalt residue from the bottom of the vacuum tower is controlled so as to produce the grade of material desired.

A number of small rundown tanks are required in which to run various grades of paving asphalts or fluxes to meet various specifications. The material is then loaded or pumped to storage. The consistency is determined by the penetration test and the various grades are included in the range from 30 to 300 penetration, with only a few points range for each grade. With the large number of grades required it is very evident that considerable blending is necessary. However, it is the usual procedure to blend asphalts with consistencies as near as possible to produce a given grade, except in cases where a definite procedure is required to produce a given product to meet certain specifications. For example, a soft flux is blended with oxidized asphalt in order to improve susceptibility characteristics, which improvement depends upon the crude source and relation between the soft flux and the oxidized asphalt.

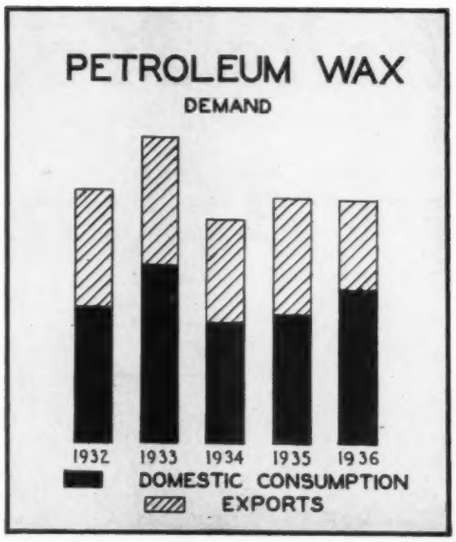
The susceptibility factor on the blend is affected more by the melting point of the oxidized asphalt than the grade of flux used in the blend, and the ductility is somewhat impaired on the higher melting-point blends. Asphalt which is not loaded for shipment is pumped to storage and it is not economical or even possible to have storage for every grade. Therefore, some blending is necessary.

CUTBACK ASPHALT

Cutback asphalt is a blend of a certain grade of asphalt and distillate, depending on specifications, and has been in great demand during the past few years. The consistency of this mixture ranges from a very light material, which is used as a prime coat, to a heavy mixture requiring considerable heat before application. After application the diluent naphtha evaporates and leaves the asphalt base for the binder. The type of road mix in which it is to be used determines the amount and volatility of the diluent and specifications are written to require producers to furnish material having these predetermined characteristics.

Roofing asphalt is manufactured by further processing a flux from the vacuum tower, the grade depending on the specifications which the finished material must meet. The process consists of air-blowing, either batch or continuous, at a temperature of approximately 450-500° F. A very small volume loss is encountered due to the low temperatures employed.

The reaction is of the exothermic type, generating sufficient heat to maintain temperature after the reaction is started. It is thought that the oxygen in the air combines with some of the hydrogen of the hydrocarbons present, forming water and being liberated as steam or combining with the hydrocarbons direct. The molecules polymerize to form molecules with higher molecular weight and melting point. Oxidized asphalts have a lower susceptibility to temperature change and a better ratio of penetration to melting point, but decreased ductility.



PETROLEUM WAX DEMAND U. S.—BBLS.

Year	Domestic	Exports	Total
1936	301,488,000	187,342,000	488,830,000
1935	261,353,000	229,905,000	491,258,000
1934	240,035,000	198,958,000	438,993,000
1933	353,243,000	247,769,000	601,012,000
1932	264,463,000	235,304,000	499,767,000

✣

SPECIFICATIONS

During the past few years great improvements have been made in the design and construction of asphalt roads and streets. These improvements have been brought about in many ways. A scientific study has been made of soil conditions, types of soil, aggregate and climatic conditions. It has been determined experimentally as well as by experience the type of construction most adaptable under given conditions and last, but by no means least, a great improvement has been made in recent years in the quality of bituminous materials.

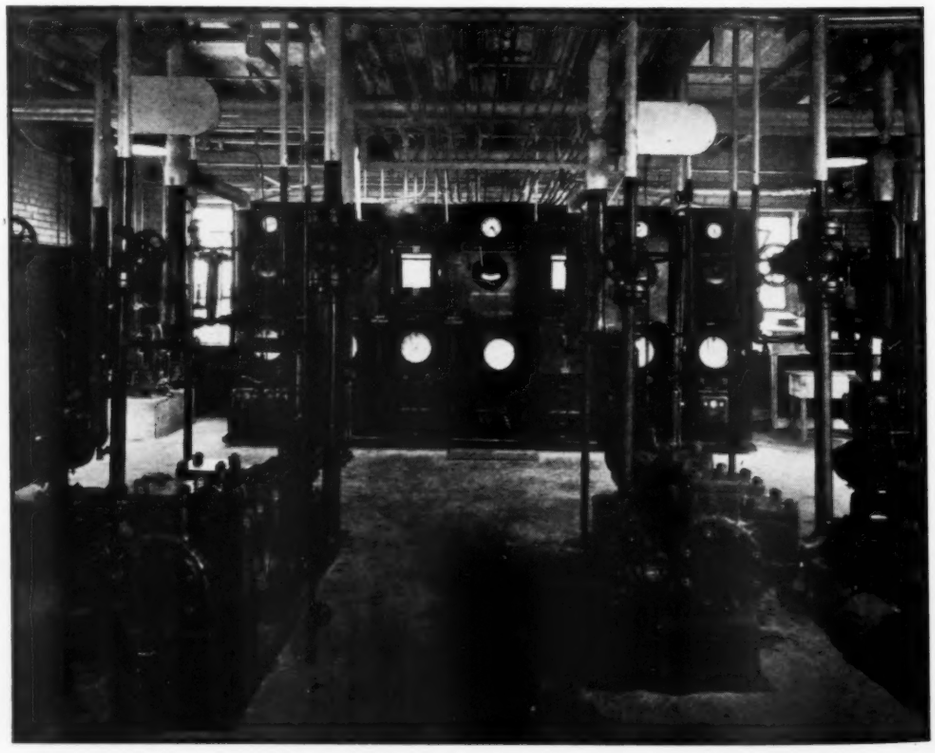
Today, asphalt specifications are being written by the various state highway departments so as to be more rigid than they were a few years ago. These are included, not necessarily as a means of identifying quality, but to admit bituminous materials which have characteristics that have been found by experience to be desirable; such asphalts having given satisfactory performance in service. These requirements being incorporated in specifications eliminate asphalts from undesirable sources, as to the crude from which the asphalt was manufactured and the process of manufacture.

Asphalt is especially adaptable to the low cost, all-weather roads as well as to the construction of high-type pavements. The demand will continue to increase so long as the producer supplies high quality material and it is used in the proper method as to design and construction by the highway engineer.

Grease Manufacturers

CLEVELAND, Ohio.—The name of the National Association of Lubricating Grease Manufacturers, Inc., has been changed to the National Lubricating Grease Institute, it is announced by D. S. Hunter, executive secretary. Membership has been made available on an associate basis to companies whose products or services are used in the manufacture, distribution or application of lubricants.

The association was established in 1932. Through interchange of ideas and dissemination of technical data, it has contributed to the promotion of standards geared to the exacting conditions of present-day automotive and industrial service. One of the major objectives of the association in 1937 is to reeducate automobile owners to the importance of regular lubrication.



Interior of control room for the operation of a new lube rerun unit at the Port Arthur, Tex., refinery of the Gulf Refining Co.

Construction picture of new 20,000-bbl.-per-day combination unit at the Shell Petroleum Corp. plant in Houston, Tex.

Antioxidants as Stabilizers for Cracked Motor Fuels

By C. G. DRYER, J. C. MORRELL and GUSTAV EGLOFF
Universal Oil Products Co. Research Laboratories

Chemical treatment, which has been used for many years, will protect cracked gasoline from deterioration, but it is relatively costly and results in losses by polymerziation and solution. In addition chemical treatment destroys components possessing valuable antiknock properties. These factors have brought about the study and application of antioxidants for the protection of cracked gasoline against deterioration in storage.

Antioxidants have been successfully used in cracked gasolines in the United States for a number of years, and are being commercially used to a considerable extent in Europe. In small concentrations they prevent gum formation, deterioration of color and loss in antiknock value. The application of inhibitors has made it possible to reduce, and in some cases eliminate chemical treatment other than sweetening.

PREVIOUS WORK

The application of inhibitors to cracked gasoline has been studied by a number of investigators. Mardles and Moss[1] reported the use of thymol and phenol to retard gum formation. Wagner and Hyman[2] found hydroquinone prevented gum formation. Egloff, Faragher and Morrell[3] studied a number of compounds which prevent gum formation, loss in color and antiknock value. Hoffert and Claxton[4] found that tricresol and other phenols as well as amines, nitro compounds and pyridine acted as inhibitors in motor benzol. The early work on antioxidants has been summarized by a number of investigators.[5] Rogers and Voorhees[5] studied a number of compounds which increased the induction period of gasoline, reporting aminophenols and substituted aminophenols to be among the most effective. Rogers, Bussies and Ward[6] studied the effectiveness of a number of inhibitors in retarding gum formation in cracked gasoline and concluded that the storage life of small samples of gasoline is a linear function of the induction period. Scheuman[7] investigated a number of commercially used antioxidants and classified them as to their potency, solubility in water and gasoline, effect on color and color stability, stabilization of octane rating and cost. A large number of compounds have been investigated in the research laboratories of this company[8-14] to determine the types of compounds which have the most desirable properties for use as commercial inhibitors, and study the factors important in their application.

The primary requirement of an antioxidant is that it gives satisfactory inhibiting value at minimum cost, but in addition it must have a number of other properties if it is to be satisfactory in commercial use. The most desirable form of an antioxidant is a liquid or a concentrated solution readily soluble in gasoline or, preferably, miscible with gasoline in all proportions. A commercial antioxidant should have low solubility in water to avoid the removal of the inhibitor from gasoline when unavoidably contacted with water either in the refinery or distribution system. An antioxidant not greatly affected by the presence of alkaline water is desirable since occasionally gasolines contain traces of alkali due to insufficient water washing or settling after doctor treatment. It is important that an antioxidant should not decrease the initial color of gasoline, should protect against darkening in storage, and occasion minimum discoloration upon exposure to light. An antioxidant should be sufficiently volatile to avoid the formation of deposits in carburetor jets and other parts of the fuel system.

Among the antioxidants which have gained commercial acceptance are U.O.P. inhibitors 1 and 4. Inhibitor 1 is a specially prepared wood tar distillate.[15] Inhibitor 4 is another product specially developed for use in cracked gasoline. Both inhibitors are liquids, readily soluble in gasoline, volatile with it and possessing definite color inhibiting properties in dark storage.

The properties of these inhibitors compared with those of a pure compound inhibitor, catechol, are shown in Table 1. Tests were conducted in four typical gasolines using concentrations of inhibitor which gave approximately the same induction period increase with each inhibitor. The results show that inhibitor 4 is approximately six times as effective as inhibitor 1. In a large number of other gasolines which have been tested the ratio of effectiveness between the two inhibitors has rangd from 6 to 10. Catechol was from 3.2 to 3.8 as potent as inhibitor 1.

LENGTH OF EXPOSURE

In order to determine whether the inhibitors were removed by contact with water the inhibited gasolines were staken for 10 minutes with 10 per cent by volume of distilled water and the induction periods redetermined. The percentage of inhibitor removed was calculated from the difference in the induction period before and after water washing. The loss was, in general, less for inhibitor 4 than for the other inhibitors. The average inhibitor removal by water was as follows: for catechol, 94 per cent; inhibitor 1, 35 per cent; and inhibitor 4, 11 per cent.

In the doctor sweetening of gasoline a small quantity of alkali may remain in the gasoline to be inhibited if not properly water washed or settled. Although this condition is unusual, it nevertheless makes the effect of alkali upon an antioxidant present in gasoline an important consid-

TABLE 1 — CHARACTERISTICS OF TREATED PRODUCTS

	Mid-Continent W. Texas Cracked Untreated				Mid-Continent W. Texas Reformed Untreated				Pennsylvania Cracked Treated				Mid-Continent Cracked Untreated			
Inhibitor used	None	UOP 1	UOP 4	Catechol	None	UOP 1	UOP 4	Catechol	None	UOP 1	UOP 4	Catechol	None	UOP 1	UOP 1	Catechol
Per cent inhibitor	...	0.06	0.01	0.013	...	0.05	0.008	0.013	...	0.005	0.001	0.0012	...	0.05	0.0105	0.012
Color, deg. Saybolt	+4	+1	+2	+4	+9	+6	+9	+9	30+	30+	30+	30+	—3	—3	—3	—3
Color stability*	...	...	...	...	...	...	...	...	29	28	28	28	...	...	...	...
Oxygen bomb stability—Ind. per., min.	130	305	305	290	130	285	305	295	135	300	345	...	145	290	305	255
Gum, mgs./100 cc., copper dish	159	40	45	10	30	25	15	10	3	5	5	4	240	61	26	79
Inhibitor removed by water:																
Ind per., min.	120	240	275	135	130	240	275	130	115	220	300	160	135	205	285	135
Per cent removed	...	31	11	91	...	29	17	100	...	30	12	84	...	52	6	100
Inhibitor removed by dilute caustic:																
Ind. per., min.	110	120	190	110	65	120	190	95	105	140	215	160	110	135	205	120
Per cent removed	...	94	54	100	...	65	29	82	...	79	48	81	...	83	41	91
Effectiveness of inhibitors based on UOP 1	...	...	6.0	3.5	...	...	6.3	3.8	...	...	6.3	...	...	...	5	3.7

*Equivalent to two hours noon June sunlight.

TABLE 2—RESULTS OF TREATMENT

	Cracking Stock: Arkansas Smackover Topped Crude			New Mexico Reduced Crude			Panhandle Topped Crude		
Treatment	None			None			None		
Gravity, °A.P.I.	56.4			59.4			60.9		
A.S.T.M. 100 cc. distillation:									
Initial boiling point, °F.	95			98			95		
Distilled over, per cent:									
10	142			140			130		
20	176			168			155		
50	264			254			234		
90	364			360			348		
End boiling point, °F.	400			401			401		
Inhibitor used	None	UOP 1	UOP 4	None	UOP 1	UOP 4	None	UOP 1	UOP 4
Per cent inhibitor	...	0.05	0.01	...	0.05	0.01	...	0.025	0.005
Color, deg. Saybolt	12	...	...	10	...	...	11	...	...
Gum, mgs./100 cc., copper dish	247	8	26	234	5	4	176	5	5
Oxygen bomb stability—Ind. per., min.	110	260	255	170	390	345	240	380	355

eration. The amount of inhibitor removed by caustic washing was determined in a manner similar to that used in the water wash tests. Inhibited gasoline was shaken for 10 minutes with 5 per cent by volume of a 1 per cent sodium hydroxide solution and the induction periods determined. The average percentage removed by the alkali was found to be, for catechol, 93 per cent; for inhibitor 1, 80 per cent; and inhibitor 4, 43 per cent.

The data showing effectiveness, water solubility and caustic solubility are summarized in Table 1.

The most general method of employing an inhibitor is to sweeten the stabilized gasoline, settle it thoroughly and add the inhibitor as it is pumped from the rundown tanks of the sweetening plant to storage. Marketable gasoline of excellent storage stability can be prepared from practically all cracked distillates in this manner. When such gasolines are marketed, dyes are frequently added to give a distinctive color.

It is sometimes desirable, usually for the production of a water white product, to give cracked gasolines some refining beyond sweetening. Even where this is done inhibitors can often be employed to an advantage. Frequently a light acid treat will produce a product of satisfactory color, but heavy treatment with large consequent losses would be necessary to produce storage stability by this means alone. Light acid treatment produces a gasoline very responsive to an inhibitor, in which the addition of small amounts of inhibitor will produce long induction period and excellent storage stability.

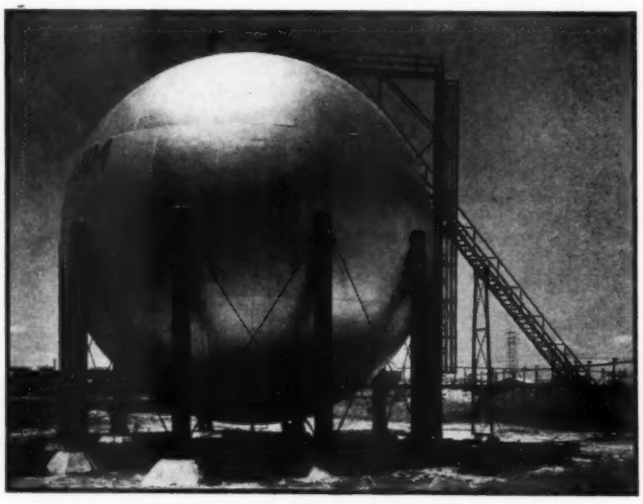
It is of particular importance in using inhibitors to know what properties of a gasoline are essential to assure satisfactory stability in storage. Many tests have been proposed for the prediction of storage stability. Those most generally used are the determination of induction period at 212° F. and 100 pounds oxygen pressure and the copper dish gum. In addition, gum tests have been made after oxidation and other determinations have been suggested.

In our opinion the best available criteria for predicting the storage stability of a cracked gasoline is the combination of induction period and copper dish gum. Neither the induction period nor the copper dish gum alone is an adequate indication of storage stability. A long induction period is usually indicative of high storage stability but occasionally gasolines with long induction periods have high copper dish gum. A gasoline having these characteristics is frequently unstable. Low copper dish gum alone is also undependable, because many unstable gasolines, especially those of low endpoint, have low copper dish gum. Exery gasoline with a long induction period and low copper dish gum that has been tested and stored in these laboratories has had a storage life of many months without significant deterioration.

The specifications which a gasoline should meet in regard to induction period and copper dish gum will naturally vary with conditions of storage and distribution, and the time elapsing before consumption. As a general rule a minimum induction period of 240 minutes is satisfactory and if the gasoline has not been chemically refined, at least 150 minutes should be added to the original induction period by the application of an inhibitor. For good storage stability, the copper dish gum should not exceed 25 mgs. as determined by the method of the Atlantic Refining Co. In studies made in this laboratory, gasoline having these properties has in no case accumulated an amount of gum making it unsuitable for use in a year's storage in contact with air at room temperature.[14]

In these laboratories the results of a large amount of work correlating induction period and storage data lead to the conclusion that an inhibitor which will produce a satisfactory induction period and low copper dish gum will protect a gasoline in storage. In the following tables are given the results of the addition of inhibitors 1 and 4 to gasolines from different sources.

In commercial use, a gasoline may have a longer or shorter storage life than in the laboratory. The low temperatures prevailing during part of the year tend to lengthen its life, the presence of water, iron, rust and perhaps traces of caustic in storage tanks would tend to decrease it.



New 10,000-bbl. pressure tank at Houston refinery of Shell Petroleum Corp.

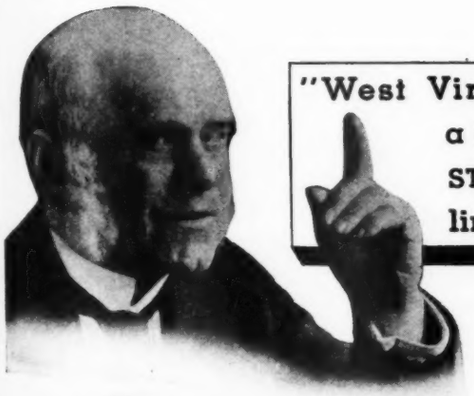
An important property of both inhibitors 1 and 4 is their applicability to practically all cracked gasolines. In an earlier paper data were presented on the application of inhibitor 1 to a large number of representative cracked gasolines.[10]

In Tables 2 to 5 are presented data covering the use of these two inhibitors 1 and 4 to gasolines from typical American oils, including those from Oklahoma, Texas, Gulf Coast, Louisiana, Montana and New Mexico. The inhibitors were used in untreated gasolines and in gasolines refined with clay and acid. It is interesting to note that while the relative effectiveness of the two inhibitors varies somewhat from one gasoline to another, either inhibitor will satisfactorily inhibit the gasolines from these stocks.

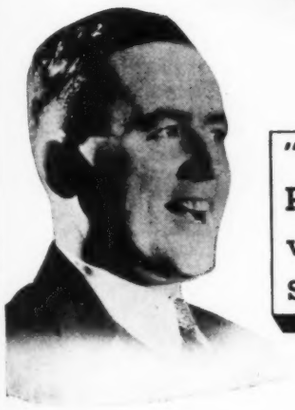
In Table 2 are given results of the inhibition of untreated cracked gasolines from three fields. Although these gasolines were initially high in copper dish gum, addition of the inhibitors reduced the gum values and increased the

TABLE 3—USE OF INHIBITORS ON TREATED AND UNTREATED STOCKS

	Cracking Stock: Oklahoma						N. Texas Gas Oil and Straightrun Gasoline						Montana Reduced Crude					
Treatment	None			Acid No. 6			None			Acid No. 6			None			Acid No. 6		
Gravity, °A.P.I.	58.8			59.9			60.7			61.8			59.9			60.6		
A.S.T.M. 100 cc. distillation:																		
Initial boiling point, °F.	106			113			104			114			89			112		
Distilled over, per cent:																		
10	144			148			135			141			131			138		
20	172			174			162			163			160			165		
50	244			240			239			233			242			238		
90	348			338			346			339			345			324		
End boiling point, °F.	406			392			397			385			400			372		
Inhibitor used	None	UOP 1	UOP 4	None	UOP 1	UOP 4	None	UOP 1	UOP 4	None	UOP 1	UOP 4	None	UOP 1	UOP 4	None	UOP 1	UOP 4
Per cent inhibitor	....	0.05	0.005	....	0.025	0.0025	....	0.05	0.01	....	0.025	0.0025	....	0.05	0.01	....	0.025	0.0025
Color, deg. Saybolt	Yellow	....	....	27	....	....	10	....	....	30+	....	....	0	....	....	29	....	....
Gum, mgs./100 cc., copper dish	264	27	81	4	5	2	274	2	3	10	0	0	53	9	11	1	2	1
Oxygen bomb stability—Ind. per., min.	115	270	205	165	415	350	70	315	260	180	880	685	240	405	450	360	980	830



"West Virginia—that's a MOUNTAINOUS STATE for a pipe line, Lad!"



"It's a Mountaineer line, Pop—but the problem of welding was in a PLAIN STATE! Here's why—"

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Comparative Data Regarding Use of Inhibitors on Various Gasolines

TABLE 4—RESULTS ON UNTREATED AND CLAY-TREATED STOCKS

	Cracking Stock											
	Louisiana Topped Crude						Louisiana Straightrun Gasoline					
Treatment	None			Clay			None			Clay		
Gravity, °A.P.I.	63.7			63.1			60.5			59.6		
A.S.T.M. 100 cc. distillation:												
Initial boiling point, °F.	96			102			94			105		
Distilled over, per cent:												
10	130			139			134			140		
20	157			162			160			163		
50	226			224			236			228		
90	334			316			354			333		
End boiling point, °F.	393			370			403			390		
Inhibitor used	None	UOP 1	UOP 4	None	UOP 1	UOP 4	None	UOP 1	UOP 4	None	UOP 1	UOP 4
Per cent inhibitor	....	0.05	0.01	....	0.025	0.0025	....	0.05	0.01	....	0.025	0.0025
Color, deg. Saybolt	12	....	....	....	....	....	10	....	....	....	....	....
Gum, mgs./100 cc., copper dish	146	57	14	10	4	1	94	11	19	10	2	3
Oxygen bomb stability—Induction period, min.	75	225	185	60	445	245	50	170	405	80	1230+	705

TABLE 5—RESULTS ON UNTREATED AND CLAY-TREATED STOCKS

	Cracking Stock																	
	Louisiana Straightrun Gasoline						Texas Panhandle Topped Crude						Coastal Straightrun Gasoline					
Treatment	None			Clay			None			Clay			None			Clay		
Gravity, °A.P.I.	55.2			54.5			59.5			60.8			57.0			55.6		
A.S.T.M. 100 cc. distillation:																		
Initial boiling point, °F.	102			118			99			112			97			110		
Distilled over, per cent:																		
10	152			169			140			150			140			154		
20	190			210			163			170			169			173		
50	264			264			254			250			243			247		
90	357			350			362			346			350			345		
End boiling point, °F	402			390			400			385			395			394		
Inhibitor used	None	UOP 1	UOP 4	None	UOP 1	UOP 4	None	UOP 1	UOP 4	None	UOP 1	UOP 4	None	UOP 1	UOP 4	None	UOP 1	UOP 4
Per cent inhibitor	....	0.025	0.0025	....	0.025	0.0025	....	0.05	0.005	....	0.025	0.0025	....	0.05	0.005	....	0.025	0.0025
Color, deg. Saybolt	4	....	....	30+	....	....	8	....	....	30+	....	....	6	....	....	30+	....	....
Gum, mgs./100 cc., copper dish	122	3	3	21	1	0	116	5	17	34	2	2	94	7	3	7	2	2
Oxygen bomb stability—Ind. per., min.	60	215	200	225	2405	1175	280	440	420	580	800	845	70	235	280	105	1385	845

TABLE 6—SOUTH AMERICAN GASOLINES

	Cracking Stock											
	Argentine Reduced Crude						Ecuador Topped Crude					
Treatment	None			V.P. Clay			None			Lq.Ph.Clay		
Gravity, °A.P.I.	58.9			60.6			57.9			58.1		
A.S.T.M. 100 cc. distillation:												
Initial boiling point, °F.	101			99			108			119		
Distilled over, per cent:												
10	151			152			150			162		
20	204			194			180			185		
50	245			235			258			253		
90	334			318			360			343		
End boiling point, °F.	393			360			406			391		
Inhibitor used	None	UOP 1	UOP 4	None	UOP 1	UOP 4	None	UOP 1	UOP 4	None	UOP 1	UOP 4
Per cent inhibitor	....	0.05	0.01	....	0.025	0.0025	....	0.05	0.01	....	0.025	0.0025
Color, deg. Saybolt	—3	—3	—3	26	26	26	5	5	5	30	30	30
Gum, mgs./100 cc., copper dish	179	14	11	36	2	4	339	116	94	94	1	1
Oxygen bomb stability—Induction period, min.	120	330	335	95	345	215	105	285	230	155	495	350

TABLE 7—RUMANIAN GASOLINES

	Cracking Stock											
	Rumanian Gas Oil						Rumanian Heavy Naphtha					
Treatment	None			V.P. Clay			None			V.P. Clay		
Gravity, °A.P.I.	60.9			59.4			54.4			53.2		
A.S.T.M. 100 cc. distillation:												
Initial boiling point, °F.	99			111			92			124		
Distilled over, per cent:												
10	133			150			162			186		
20	159			176			215			226		
50	235			240			283			282		
90	333			324			334			330		
End boiling point, °F.	368			365			372			362		
Inhibitor used	None	UOP 1	UOP 4	None	UOP 1	UOP 4	None	UOP 1	UOP 4	None	UOP 1	UOP 4
Per cent inhibitor	....	0.05	0.005	....	0.025	0.0025	....	0.025	0.0025	....	0.025	0.0025
Color, deg. Saybolt	5	5	5	30+	30+	30+	6	6	6	30+	30+	30+
Gum, mgs./100 cc., copper dish	232	6	3	4	1	3	38	3	1	6	3	2
Oxygen bomb stability—Induction period, min.	35	210	190	250	1175	595	75	360	310	150	1965	925

	Cracking Stock											
	Rumanian Kerosene						Rumanian Pressure Distillate Bottoms					
Treatment	None			V.P. Clay			None			V.P. Clay		
Gravity, °A.P.I.	62.8			61.9			59.6			59.6		
A.S.T.M. 100 cc. distillation:												
Initial boiling point, °F.	96			106			104			110		
Distilled over, per cent:												
10	130			140			136			149		
20	155			163			160			173		
50	234			231			235			238		
90	318			313			328			328		
End boiling point, °F.	360			357			365			361		
Inhibitor used	None	UOP 1	UOP 4	None	UOP 1	UOP 4	None	UOP 1	UOP 4	None	UOP 1	UOP 4
Per cent inhibitor	....	0.05	0.01	....	0.025	0.0025	....	0.025	0.01	....	0.025	0.0025
Color, deg. Saybolt	13	13	13	30+	30+	30+	16	16	16	30+	30+	30+
Gum, mgs./100 cc., copper dish	25	3	3	4	2	1	105	7	3	0	2	1
Oxygen bomb stability—Induction period, min.	95	245	295	105	1525	655	110	235	265	180	1110	455

TABLE 8—MEXICAN GASOLINES

	Cracking Stock											
	Posa Rica Reduced Crude and Kerosene						Posa Rica Cracked and Reformed Blend					
Treatment	None			UOP Treat			None			V.P. Clay		
Gravity, °A.P.I.	61.2			60.1			59.7			58.4		
A.S.T.M. 100 cc. distillation:												
Initial boiling point, °F.	98			101			99			106		
Distilled over, per cent:												
10	129			154			142			162		
50	240			268			247			249		
90	347			359			346			346		
End boiling point, °F.	397			400			390			391		
Inhibitor used	None	UOP 1	UOP 4	None	UOP 1	UOP 4	None	UOP 1	UOP 4	None	UOP 1	UOP 4
Per cent inhibitor	....	0.05	0.01	....	0.025	0.0025	....	0.05	0.01	....	0.025	0.0025
Color, deg. Saybolt	14	....	....	30	....	....	11	....	....	29	....	....
Gum, mgs./100 cc., copper dish	277	2	3	1	0	292	6	6	22	1	3	
Oxygen bomb stability—Induction period, min.	80	365	265	440	1070+	1070+	85	350	290	80	725	370

induction period sufficiently to assure satisfactory storage stability for many months.

In Table 3 are given data on the use of the inhibitors in untreated and acid treated cracked gasolines from three other stocks. These data show satisfactory reduction in gum and increase in induction period when the inhibitors are added to the untreated gasolines. The acid treatment of these gasolines did not produce a product as stable as the untreated gasoline after the addition of the inhibitor. The addition of small amounts of inhibitor makes more drastic treatment unnecessary. It may be concluded that acid treatment may be eliminated in many cases, as satisfactory reduction in copper dish gum and increase in induction period may be accomplished by the addition of an inhibitor.

USE OF INHIBITORS

In Tables 4 and 5 are given data on the use of inhibitors in untreated and clay treated cracked gasolines from five additional stocks. These data show the effect of the inhibitors on the untreated gasolines, and in most cases the untreated gasoline, after addition of inhibitor, is better suited for storage of several months than the clay treated gasoline without inhibitor.

In order to show a more general application of the inhibitor, results are given in the Tables 6 to 9 on gasolines from other important oil producing countries—Mexico, Rumania, Argentine, Ecuador and Canada.

TABLE 9—CANADIAN GASOLINE

	Cracking Stock Turner Valley Topped Crude		
Treatment	None		
Gravity, °A.P.I.	60.3		
A.S.T.M. 100 cc. distillation:			
Initial boiling point, °F.	114		
Distilled over, per cent:			
10	156		
20	204		
50	250		
90	344		
End boiling point, °F.	398		
Inhibitor used	None	UOP 1	UOP 4
Per cent inhibitor		0.05	0.01
Color, deg. Saybolt	14	14	14
Gum, mgs./100 cc., copper dish	280	6	5
Oxygen bomb stability—Ind. per., min.	55	260	205

In a comparison of the treated and untreated distillates it is indicated that clay treatment alone is not sufficient to assure storage stability. In every case, with one exception, the untreated inhibited gasoline is more stable as regards gum content and induction period than the clay treated product without inhibitor. However, if a water white product is desired, an inhibitor in very small concentrations may be used to advantage to give added stability to the gasoline and increase the clay life.

The gasoline produced from Posa Rica Mexican crude was refined by the UOP treating process. This method consists in treating the gasoline with aqueous hydrogen chloride in the presence of brass. This process has been employed for the treatment of a large number of cracked distillates and has given excellent results. Gasolines treated by this method are particularly stable as regards gum content, and induction period, and also show high inhibitor susceptibility.

SUMMARY

The desirable properties of a commercial inhibitor are high potency in relation to cost, ease of solubility in gasoline, insolubility in water and dilute caustic soda, no color depreciation when added to gasoline and sufficient volatility to leave no deposit when the gasoline evaporates.

UOP inhibitors 1 and 4 and catechol have been compared in respect to these properties.

Inhibitors are successfully employed in doctor sweetened gasolines without further refining, and in acid treated and clay treated gasolines to increase the stability and to reduce the severity of refining.

The most reliable test methods of predicting storage stability of gasolines are induction period and copper dish gum.

Examples are given of the successful application of inhibitors to commercial gasolines from important oil producing fields in the United States and other countries.

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Rosoff Heads Amtorg

NEW YORK.—David A. Rosoff has been elected chairman and president of Amtorg Trading Corp., succeeding Ivan V. Boyeff, who will return shortly to the Soviet Union. For the past year and a half Mr. Rosoff has been first vice president of Amtorg. Prior to that he headed various Soviet foreign trade organizations. He was formerly president of Soyuzmetimport (all union metals import corporation) and general director of Manganexport (manganese export corporation).

Commissar Valerian Ivanovich Mezhlauk has been appointed head of heavy industry. An admirer of American industry, Mr. Mezhlauk is expected to revive the use of American experts and machines in Russian industry, including the development of oil production and refining there.

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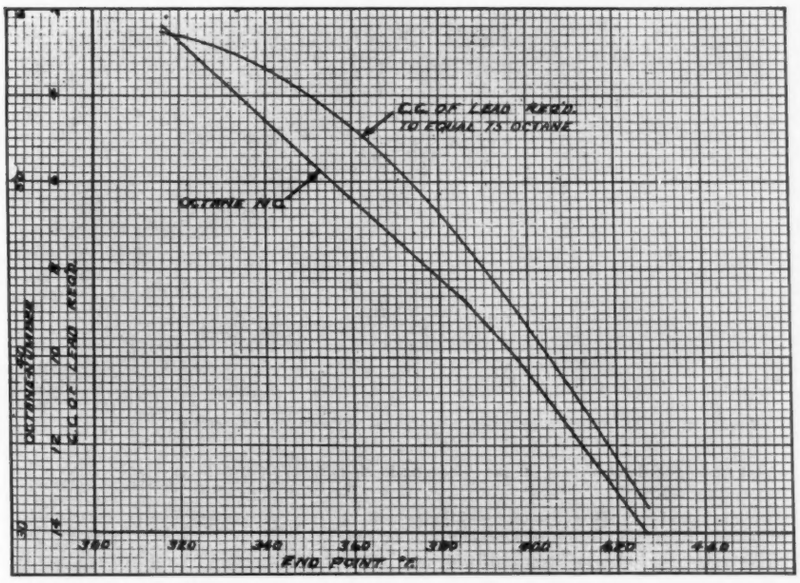
Characteristics and Yields of North Louisiana Crude Oils

By A. W. TRUSTY
Arkansas Fuel Oil Co., Shreveport, La.



Knock ratings on gasoline fractions made from Caddo light crude

North Louisiana has about 4,300 producing oil and gas wells with an average oil production of about 81,000 bbls. per day. Although a small part of the oil is naphthene base or intermediate-paraffin base, the majority of the production is paraffin base oil. The sulfur content of the oils is low, even on the naphthenic crudes.

The majority of the straightrun gasolines require a blend with natural gasoline in order to meet the volatility specification of commercial gasolines. Due to the low sulfur contents, the gasolines rarely need chemical treatment to meet corrosion, doctor or sulfur specifications.

High yields of kerosene are realized. After doctor treatment the kerosenes have a low sulfur content, are stable to storage and have unusually good burning qualities.

Lubricating oils can be produced from Rodessa, Caddo, Bellevue and Urania crudes. Only small yields are obtained from the remainder of the crudes. A high quality asphalt can be produced from Bellevue, Caddo and Urania crudes.

Bellevue field (Bossier Parish)—Discovered in 1921, the Bellevue field has been Louisiana's shallowest production. The first well was completed at a depth of 396 feet, with an initial production of 6,000 bbls. daily from the Nacatoch sand. Producing horizons have also been found at 1,010 and 1,800 feet. A 6,137-foot deep test was nonproductive. The total production to date is about 9,400,000 bbls.

Bellevue crude is naphthene base. The laboratory yields are as follows:

	Per cent	Gravity	NPA color	Pour	Viscos. S.U. 100°F.
Gas oil	30	25 6	2	0	52
Lubricating oil	41	22 0	4	0	500
Asphalt	28	8.0	..	..	...
Loss	1.0	....	..	..	...

Representative tests on the asphalt are:

Specific gravity at 77° F.	1.014
Melting point, B.&R.	101
Penetration at 77° F.	146
Penetration at 32	40
Sulfur, per cent	1.3
Flash (Cleveland open cup)	590
Fire (Cleveland open cup)	690
Bitumen soluble in carbon disulfide (per cent)	99.9
Bitumen soluble in tetrachloride (per cent)	99.85
Ductility	100+

Caddo field (Caddo Parish)—The Caddo oil and gas field, which is made up of a number of separate pools extending across the state line into Marion County, Texas, is one of North Louisiana's oldest fields. Production comes from five depths:

	Feet
Nacatoch	800
Annona Chalk	1,400
Glen Rose	3,600
Travis Peak	4,000

Total production to date is 149,000,000 bbls.

Caddo heavy crude produces light lubricating oils with a 0° F. pourpoint. S.A.E. 30-70 oils contain some paraffin wax, the pourpoint going as high as 30° F.

The crude oil from the Hosston field produces lubricating oil with unusually low pourpoints. Laboratory tests on oils from this crude are shown below:

S.A.E. No.	20	30	40	50	60
Gravity	23.4	22.4	22.3	22.2	21.7
Flash	400	430	465	480	515
S.U. vis. at 100	312	560	825	1275	2100
S.U. vis. at 210	53	61	72	87	117
Viscosity index	87	76	75	73	71
Pourpoint	—30	—15	—10	—5	—0
Color, NPA	2½	3	3½	4½	5
Carbon residue	.03	.04	.08	.29	.35

Cotton Valley (Webster Parish)—The Cotton Valley field was discovered in 1924. The first production was from the Blossom sand at 2,200 feet. In 1926 two wells were brought in at 4,300-4,400 feet from the anhydrite zone. In 1936 production was found at 5,500 and 8,100 feet. The total production to date has been 14,500,000 bbls. of oil and 73,000,000,000 feet of gas.

Production from the deep zone is a light distillate. The nature of the distillate and products is shown below:

ASTM distillation:	Crude	Gasoline	Kerosene	Gas oil
Gravity	61.1	66.6	48.0	40.5
I.B.P.	87	90	370	540
10 per cent at	144	140	395	540
20	178	164	406	550
30	210	187	413	559
40	243	207	421	570
50	277	227	428	584
60	324	247	436	602
70	383	270	445	622
80	464	297	459	649
90	564	330	474	692
Endpoint	642	390	508	...
Recovery	91	97.5	99	...
Color	1 NPA	30+	30+	2 NPA
Corrosion	Neg.	Neg.	Neg.	...
Doctor	Neg.	Neg.	Neg.	...
Octane number	...	54	...	...
Pourpoint	...	...	...	55° F.

Haynesville field (Claiborne Parish) — This field, discovered in 1921, has produced a total of 65,500,000 bbls. of oil to date. Production comes from the Buckrange horizon at 2,850 feet and the Glen Rose at 4,300 feet.

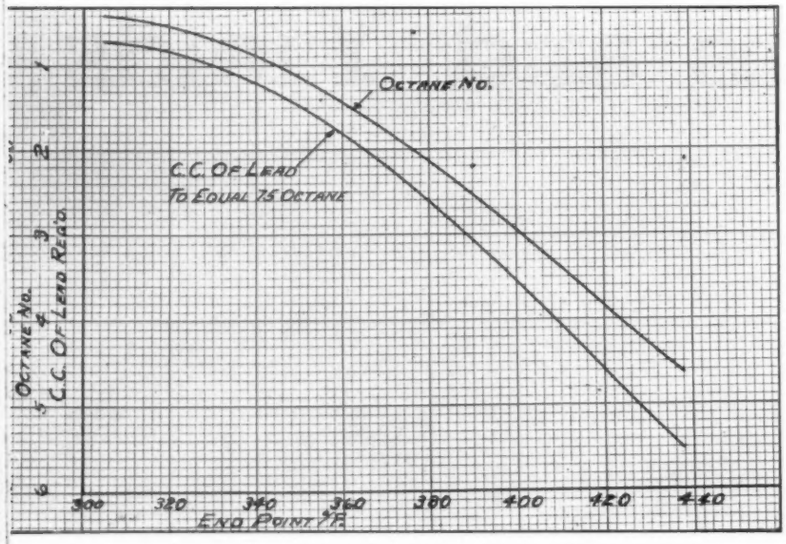
The Homer field (Claiborne Parish)—Production in the Homer field comes from the Nacatoch sand at 1,400 feet and the Buckrange at 2,800 feet. Total production to date has been 66,000,000 bbls.

SUMMARY OF YIELDS OF NORTH LOUISIANA CRUDES

Field—	Gravity	S.U. vis. at 100°F.	Sulfur	Pour-point	Base[5] of crude	% 400 E.P. gasoline	Octane No. of gasoline	Pct. kerosene	Lubricating oil	Average daily production
Bellevue	18.3	1,480	.70	0	N[2]	0	..	0	41	960
Bull Bayou-Red River	40.0	39	.23	0	P	15	37	40	10	1,455
Caddo light	38.0	45	.30	30	P	22	38	22	12	6,720
Caddo heavy	25.0[3]	280	.42	0	N	0	..	0	40	(*)
Cotton Valley	28.5	130	.40	50	I.P.	0	..	10	15	800
Cotton Valley	45.0	41	.20	15	P	28	43	6	8	(†)
Carterville	43.0	45	.2	35	P	32	40	22	8	420[4]
Converse	38.0	60	.15	40	P	15	40	27	8	825
Elm Grove	29.5	75	.38	35	I.P.	5	..	15	..	400
Haynesville	35.0	54	.35	45	P	19	53	17	8	3,400
Homer	35.0	57	.80	30	P	25	45	15	8	2,565
Holly	37.0	49	.25	0	P	22	34	25	..	131
Pleasant Hill	39.0	45	.30	0	P	20	38	30	8	145
Rodessa[1]	44.0	42	.30	0	P	29	38	17	15	59,111
Sarepta	27.0	165	.40	0	I.P.	0	..	0	..	.....
Sligo	40.0	44	.15	30	P	15	42	20	12	.....
Zwolle	40.0	40	.20	45	P	20	40	25	10	993
Urania-Tullos	21.3	625	.35	0	N	0	..	0	45	3,082

*Total Caddo. †Total Cotton Valley.

[1] The Oil and Gas Journal, October 15, 1936, page 100.
[2] N — naphthene base; P — paraffin base; M — mixed base; I.P. — intermediate paraffin.
[3] Average; Hosston crude is 18 A.P.I. gravity.
[4] Includes Sarepta-Spring Hill fields.
[5] Base of a crude oil. Bureau of Mines R.I. 3279. Bulletin 22, Louisiana Department of Conservation.



Knock ratings on gasoline fractions made from Haynesville, La., crude

of oil and 5,500,000,000 feet of gas. The gas is rich in gasoline content.

Holly field (DeSoto Parish) — Discovered in 1930, this field gave promise of being one of major importance, but was soon outlined as a small producing area. Production comes from the Eagleford horizon and the total production to date is about 850,000 bbls. The crude oil has a typical paraffin base.

Tullos-Urania field—Located in LaSalle, Grant and Winn parishes, this field has produced to date about 20,500,000 bbls. of oil. Production comes from the Wilcox sand at a depth of 1,530 feet. The crude yields a naphthenic lubricating oil and an asphalt residue.

Pleasant Hill (Sabine-DeSoto parishes)—The Pleasant Hill field was discovered in 1927 and was readily outlined as a small producing area. Production comes from the Washita horizon at 3,000 feet. Total production to date is 1,500,000 bbls.

DeSoto-Bull Bayou-Red River fields—Gas was discovered in 1912 in DeSoto Parish and oil was discovered in 1913. Production comes from the Nacatoch sand at 800 feet and the Basal Upper Cretaceous at 2,625 feet. Total production to date from these is 56,000,000 bbls.

Lincoln-Bienville parishes—Deep tests in these two parishes have found production at 5,600 and 6,560 feet in the Glen Rose and Travis Peak horizons. The wells are producing gas and distillate. The nature of the distillate is shown in table.

Rodessa (Caddo Parish)—Discovered in 1935, the Rodessa field extends into Cass County, Texas, and definite outlines of the field have not yet been determined. An article in the October 15, 1936, issue of The Oil and Gas Journal gives considerable laboratory data on this crude.

Zwolle field (Sabine Parish)—The production from the Zwolle field comes from a chalk rock formation at a depth of about 2,300 feet. Discovered in 1928, this field has been one of the most phenomenal fields that Louisiana has known. Offsets to enormous production may prove dry and production may be found in what would seem to be condemned locations. This fact has led to the drilling of many wells that were direct offsets to dry holes on three sides. Total production to date is about 12,000,000 bbls.

DISTILLATION DATA

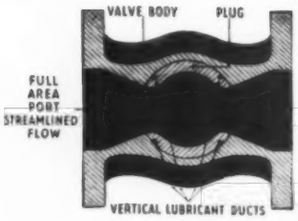
	Original distillate	60% Gasoline overhead	39% Kerosene
Gravity	58.0	61.0	51.3
I.B.P.	158	150	390
10 per cent at	256	245	409
30 per cent at	320	284	420
40 per cent at	338	298	425
50 per cent at	361	307	431
60 per cent at	380	322	439
70 per cent at	396	334	448
80 per cent at	416	346	460
90 per cent at	441	362	482
Endpoint	505	393	532
Color	30+	30+	30
Corrosion	Neg	Neg	Neg
Doctor	Neg	Neg	Neg
Octane number	...	20	...

Indianapolis Race

The lessons in fuel efficiency which come out of the 500-mile race at Indianapolis on May 31 will be immediately passed on to the motoring public. The cars must use stock gasoline, obtainable at the corner filling station and the mixture will be subjected to intense scrutiny by the technical committee. For the first time in four years drivers will be allowed an unlimited amount of fuel but never have they been confined as to the mixture. Heretofore they have used a "hopped-up" fuel, which is a varied combination of benzol, Ethyl and high-test gasoline. According to rules recently issued, fuel to be used this year is defined as a "bona fide commercial gasoline of a brand or trade name in use at least one year prior to May 1, 1937."

NEWMAN-MILLIKEN

GLANDLESS LUBRICATED PLUG VALVES



NOTE THEIR UNIQUE FEATURES:—

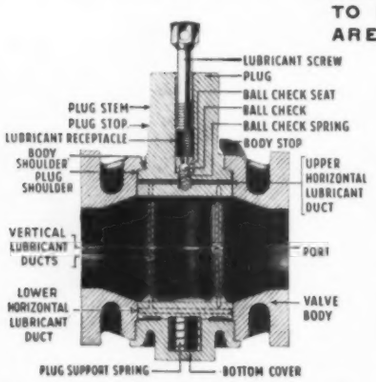
PARALLEL PLUG—ALWAYS IN WORKING CONTACT WITH ITS SEATING

NO GLAND—NO PACKING —NO GASKETS

SELF SEALING

VISUAL CHECK ON FULL LUBRICATION

PORT OPENINGS EQUAL TO FULL SIZE PIPE AREA



There is a Newman - Milliken Valve for every service. Special patterns in special metals are available and pressures ranging from vacuum to 3,000 lbs. per square inch can be dealt with.

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WOODCHESTER, GLOS. ENGLAND.

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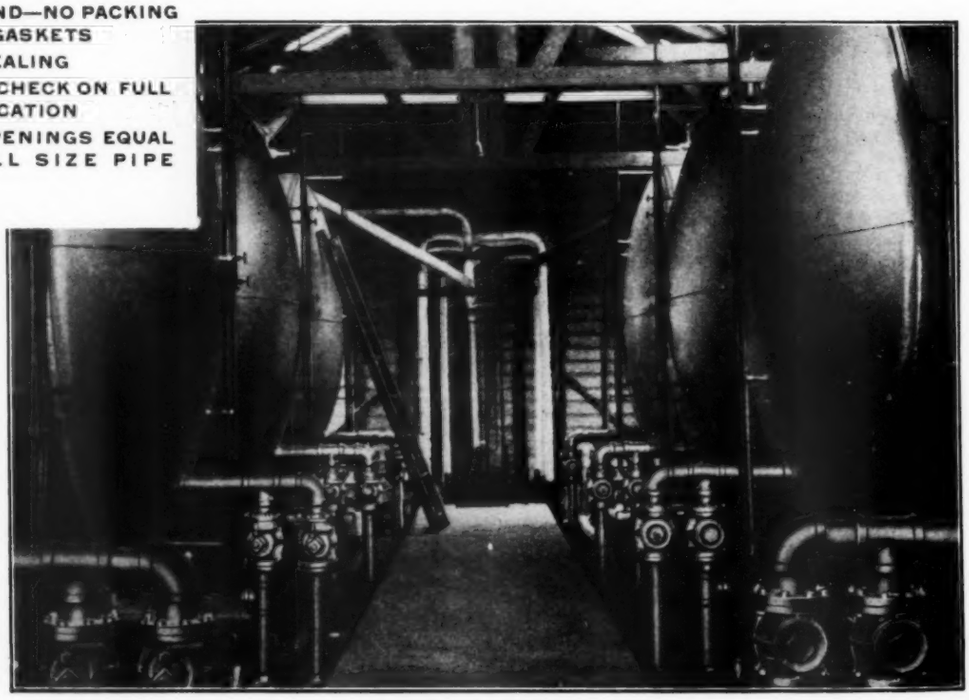

INSTALLATION SHOWING NEWMAN-MILLIKEN VALVES ON GASOLINE STORAGE TANKS

COMPLETIONS ON TIME

Time is an important factor and Badger engineers are just as anxious to turn the project over to the client "completed" as the client is to get it.

Badger's "On Time" record is high, due largely to the exceptional care and accuracy in planning the design, purchasing and construction.

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●

Engineers and Contractors
for Petroleum Distillation and Refinery Equipment

United Builds Variable Fuel Boiler Plant

New boiler plant

Another step in a program which has seen the United Refining Co.'s refinery at Warren, Pa., almost entirely rebuilt in the past five years was completed recently with the erection of a variable fuel boiler plant. Other steps in the modernization program included erection of a new cracking unit, wax plant, rerun unit, crude unit and considerable tankage.

The increased load occasioned by the steady addition of this new equipment necessitated the operation of the old boilers at much higher ratings than standard practice with resultant high maintenance and low efficiency. The new plant has a guaranteed efficiency of 80 per cent.

Advantages of a variable fuel unit are evident. The new United Refining Co. plant operates on pulverized coal, residue from the cracking unit and spill-over still gases. In the event natural gas becomes available in sufficient quantities, the basic design of the plant will permit conversion to this fuel in a short time.

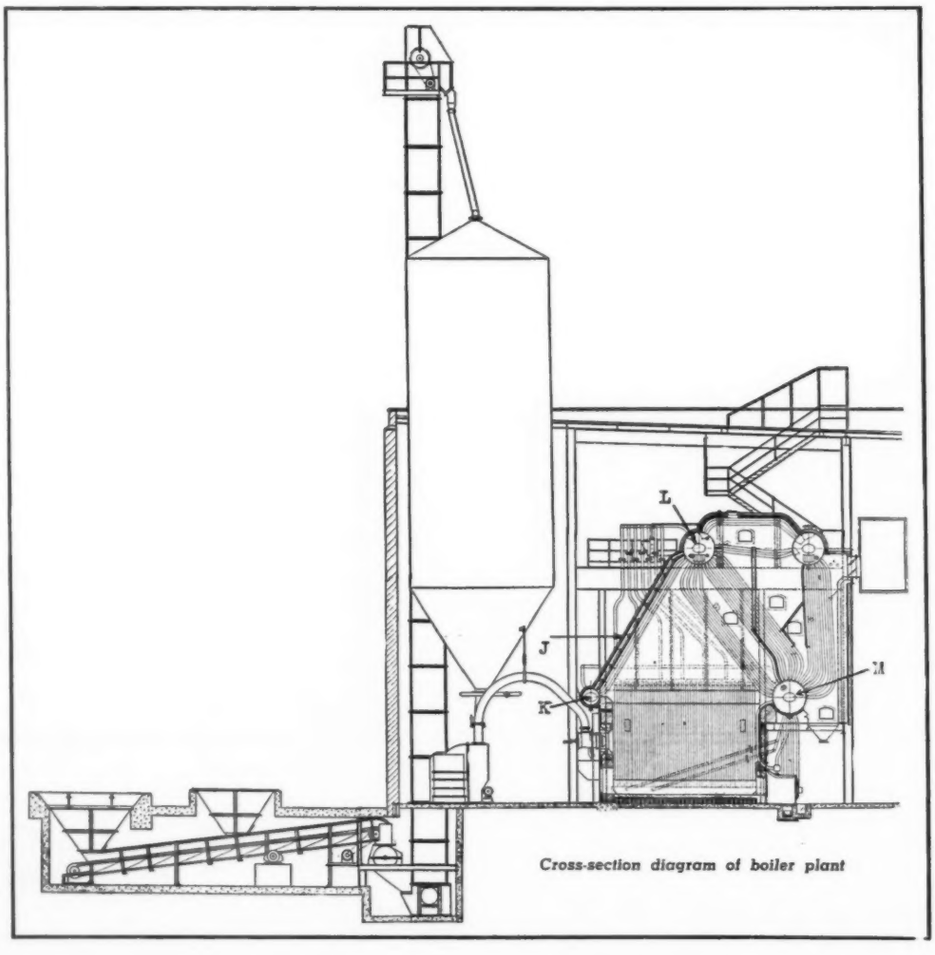
The control system will handle either coal or oil but not a combination of these fuels on one boiler. A boiler may be switched instantly from one fuel to another and one boiler may operate on coal and the other on oil and both be under full automatic control. The still gas, however, is burned under hand control only.

The basic fuel, naturally, is coal. One of the specified conditions was that it should be possible to burn low-grade Pennsylvania coal running as high in ash as 12 to 13 per cent with 13 per cent moisture as fired, 11,000 B.t.u. per pound and an ash softening temperature of 2,100 degrees. Use of such coal is virtually positive assurance that shortage of high-grade coal, etc., would not hold up operation of the plant since, in an emergency, coal from nearby "wagon mines" could be used.

Coal may be received either from the company's private siding where cars would discharge directly into the horizontal coal conveyor which discharges into the elevator boot or by trucks which would discharge through a separate opening into the same conveyor. Each boiler has an individual coal silo, served by the one elevator, from which the fuel is fed by gravity to the pulverizers.

Each boiler is fired by an aero pulverizer having a capacity of 8,000 pounds of coal per hour continuously and driven by a 100-horsepower motor. Each pulverizer is equipped with an air-swept classifier insuring uniform fineness of coal to the burners regardless of hammer wear or condition of the coal. Natural draft type combination pulverized coal and oil burners are installed on each boiler.

The comparatively low operating pressure and low cost of coal did not justify installation of air preheaters, particularly in view of the possibility of natural gas being available within a year or so. Consequently the preheat in the primary air necessary to handle high moisture coals is obtained by high-pressure heaters which use steam at boiler pressure and are mounted directly on the pulverizers. These air heaters are under automatic temperature control.



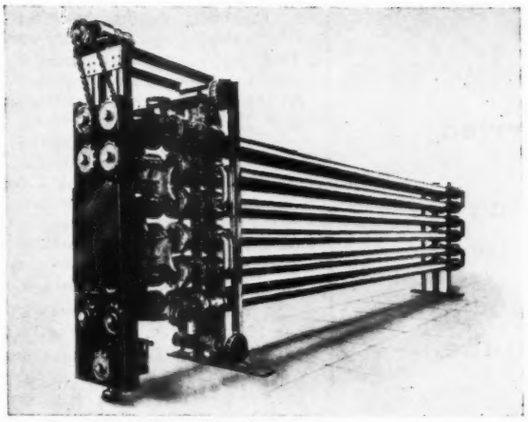
Cross-section diagram of boiler plant

For burning the spill-over still gas, each boiler is equipped with two inspiring type gas burners.

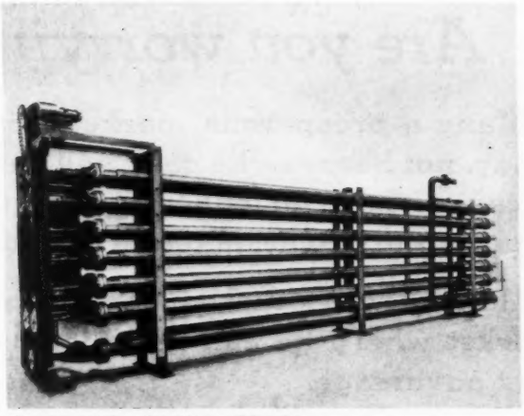
Both the boilers, manufactured by Union Iron Works of Erie, Pa., are of the radiant heat type with water cooled side and bridge walls. They have a design pressure of 250 pounds and an operating pressure of 200 pounds. Each has 5,800 square feet of heating surface in the main bank and approximately 660 square feet of water-cooled surface in the side and bridge walls. The normal steaming capacity of each boiler is 55,000 pounds per hour.

The noteworthy feature of this type of boiler is the replacement of the upper front wall with a radiant type heating element (J). This element consists of two rows of upflow tubes from the radiant heat drum (K) to the upper front drum

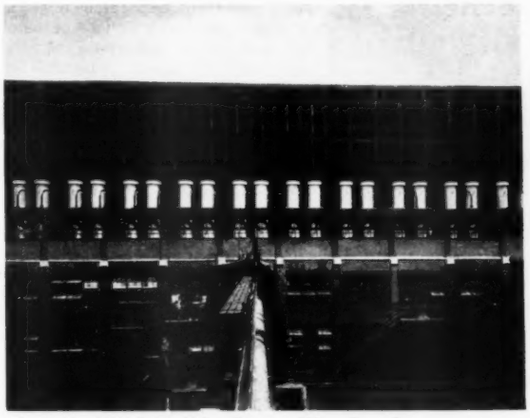
CARBONDALE



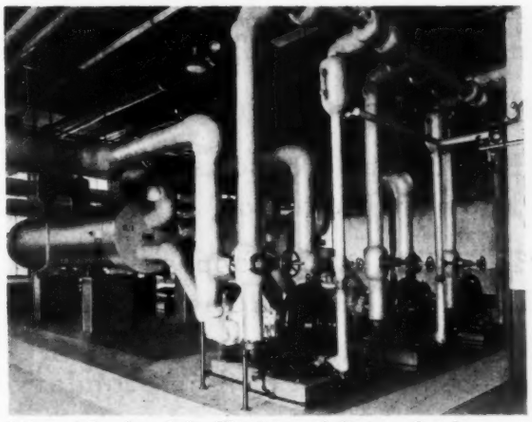
Carbondale Heat Exchanger



Carbondale Chilling Machine



Twenty Carbondale Spira Flo Condensers, 4000 tons refrigerating capacity



Three Carbondale Horizontal Brine Coolers, with Brine Pumps and Connections

1937 MODERN EQUIPMENT 1937 for REFRIGERATION and DEWAXING

COMPRESSION REFRIGERATION SYSTEMS
Single and 2-Stage

ABSORPTION REFRIGERATION SYSTEMS

FILTER PRESSES

Carbondale engineers, with a background of 35 years of refinery refrigeration experience, stand ready to discuss your needs.

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LOS ANGELES NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH ST. LOUIS ST. PAUL SAN FRANCISCO SEATTLE TULSA WASHINGTON

Are you worrying?

Many a prosperous marketer is worried today, not because he can't sell gasoline but because he can no longer be sure of getting it in unfailing supply on terms that let him live.

Many a worried producer is looking for a market where he can sell his crude to the best advantage.

Many a worried skimming plant refiner can't buy the crude he needs because he can't sell his straight-run gasoline.

All three are getting the worst of it.

Here comes Parsons. He isn't worried—he knows what to do.

He builds a Dubbscracking unit for the refiner and there's the source of gasoline supply for the marketer—and Parsons units to make the most of the secondary products—there's more revenue for the refiner.

And the refiner can buy crude—and pay the price for it. There's the outlet for the producer.

The refinery pays for itself in a hurry and goes on earning money for the men who were wise enough to get Parsons on the job.

PARSONS

THE RALPH M. PARSONS CO.

CHICAGO DALLAS LOS ANGELES NEW YORK

ASSOCIATED WITH

H. A. BRASSERT & COMPANY

CHICAGO LONDON

(L), staggered for exposture to the radiance of the furnace. A series of downflow tubes between these two drums is baffled off from the upflow tubes as indicated on the diagram. A positive supply of water to the radiant heat drum is assured by two circulators, outside the boiler settings, connecting with the mud drum (M).

The first row of tubes in the main bank is so spaced as to form a slag screen.

The boiler settings have sectionally supported side walls in the first pass and furnace section. These walls start above the side water screen and provide a design that does not impose any load on the water walls. This permits replacement of tiles from the outside where the tubes would prevent renewal from the inside. All walls are insulated with plastic insulation and the settings are completely enclosed in a No. 11 gauge steel plate casing in order to reduce radiation and infiltration losses to a minimum. The furnace floors are constructed of standard fire brick laid on insulation over hollow tile to permit natural draft cooling of the furnace floor.

A new radial brick stack, 10 feet in diameter and 225 feet high, serves the boilers.

In addition to the continuous blow-down system, all blow-off openings are equipped with tandem blow-off valves.

Cleanliness of boiler surface is insured by a soot blowing system. There are five soot blowing units per boiler; three having seamless drawn heat resistant type elements with alloy intimate contact bearings and two of seamless drawn steel.

A hydrojet ash removal system handles the ash which is blown toward the rear of the furnace by a steam lance operated through large access doors in the front. The ash is raked into a trench through similar doors in the rear, the operator shielded by a dog house over the rear door. The ash removal system is also directly connected to the soot hoppers at the rear of each boiler.

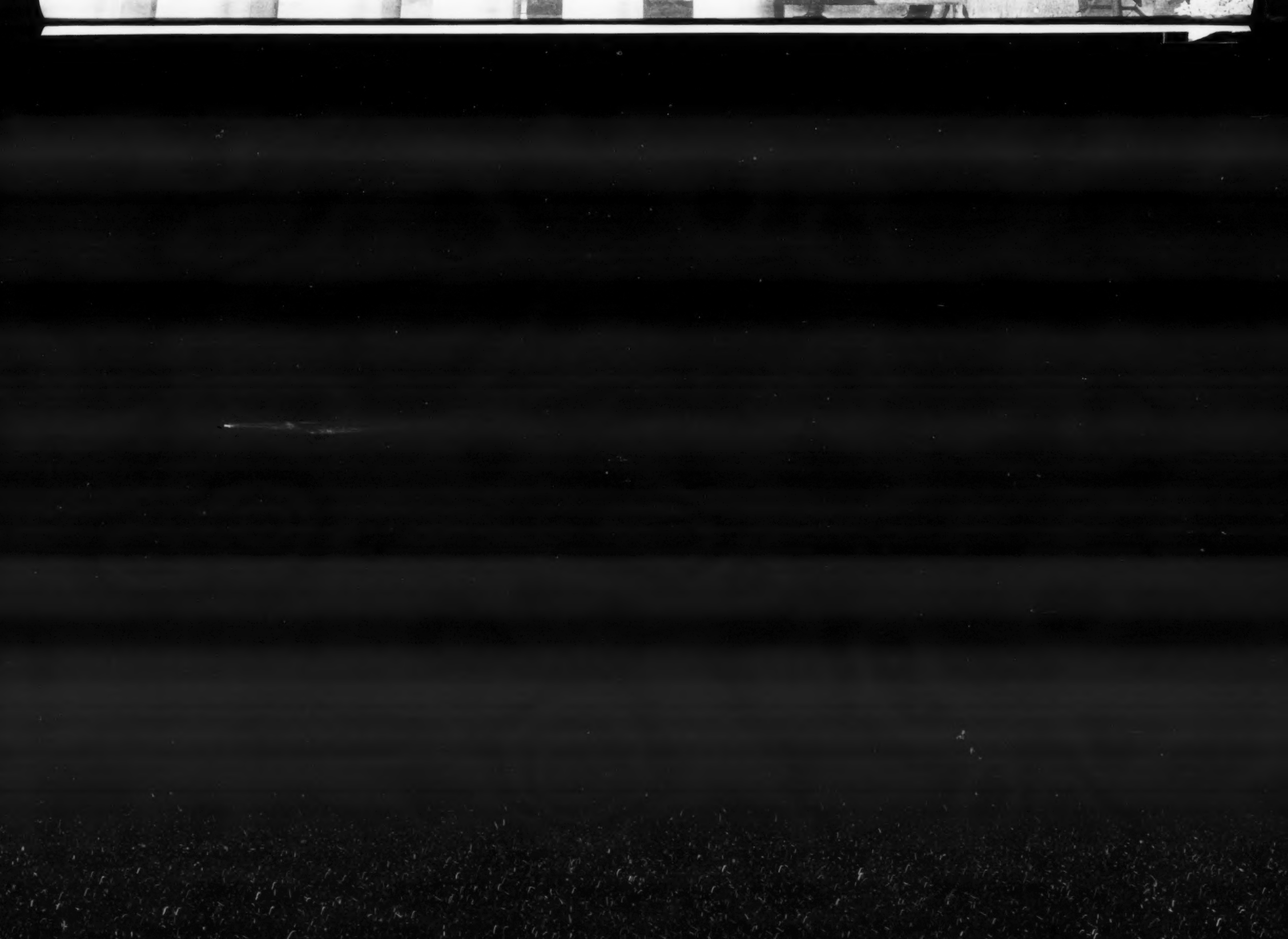
High operating efficiency and unvarying steam pressure are maintained by a full automatic control system functioning primarily from the boiler header pressure and increasing or decreasing the fuel supply in accordance with the load. Proper fuel-air ratios are maintained by secondary impulses to the system from the furnace draft and from the draft loss in the boiler.

The boilers are equipped with the latest multiple indicating and recording instruments. One multiple point indicator on each boiler indicates steam flow, per cent CO_2, uptake draft and furnace draft on separate horizontal internally illuminated scale mounted one above the other, another records simultaneously on one chart the record of steam flow, per cent CO_2 and the flue gas temperature, and a third provides a record of steam pressure, feed water pressure and feed water temperature. An indicating steam pressure gauge on the main panel board indicates the main header pressure. Each boiler is equipped with double illuminated water columns with inclined gauge glasses so that they are easily visible.

Operation of boilers with extensive water cooling and at high ratings requires best quality feed water. The feed water is treated by a hot process lime soda system with a capacity of 14,000 gallons per hour. The system is designed to maintain feed water at practically zero hardness with not more than two grains per gallon of calcium and magnesium salts in solution. Feed water leaves the softener at 210° F. and, having been filtered, is free from any suspended material. Check analyses of softener performance are made at frequent, stated intervals.

The boilers are fed by duplex pumps in duplicate. Steam-driven auxiliaries have been used where any failure of current supply would cause a shut-down. A third duplex pump serves as a boiler house service and fire pump and, in an emergency, can be used as a boiler feed pump. The fuel oil pumps and the air compressor for the control system are steam driven so that if there should be a failure in the current supply while the boilers are operating on coal, they could be cut over immediately to oil without interruption in steam supply, loss of automatic control or noticeable drop in steam pressure.

The principal construction work on the building, coal elevators, piping, etc., was done by United Refining Co. employes. C. W. E. Clarke of Philadelphia was consulting engineer.

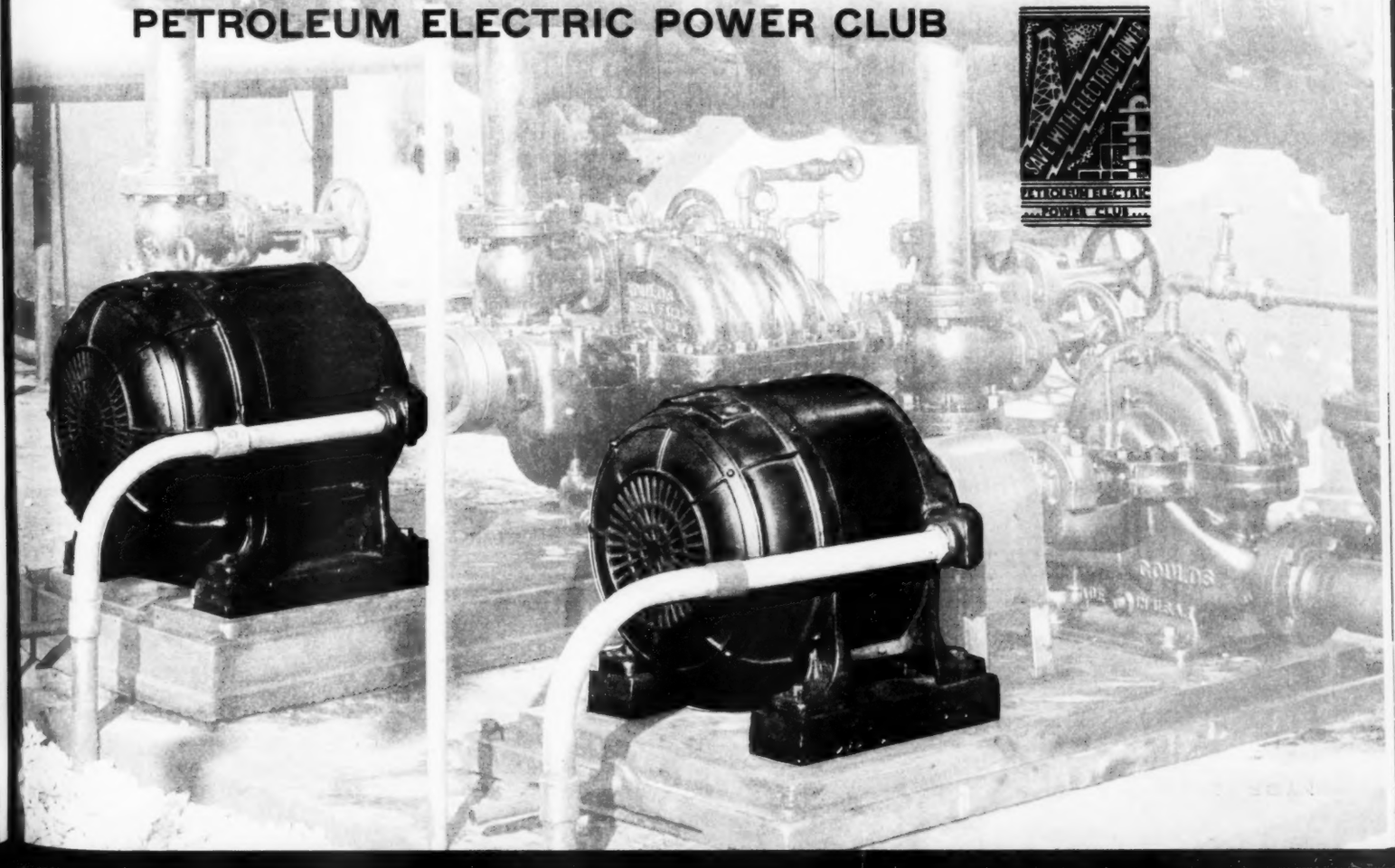


THE REFINER, like the Producer and the Pipe Liner, likes the low first cost and subsequent economy of electrical installations, leaving capital free for aggressive executive methods in this year of opportunity.

And he likes the extreme dependability of Purchased Electric Power, leaving minds and men free for constructive work.

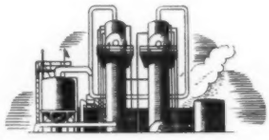
PURCHASED ELECTRIC POWER

PETROLEUM ELECTRIC POWER CLUB



THE COMPANY BACK OF PURE OIL PRODUCTS

Pure Oil has over 5,000 producing wells located in nine states. Production of different types of crude oil enables the company to select the best type from which to refine any petroleum product.



Pure Oil has 7 modern refineries, strategically located with relation to oil fields and marketing areas. Over 300 products are manufactured for automotive and industrial use.

Pure Oil's well balanced transportation system utilizes pipeline, water, rail, and truck facilities for the economical transportation of both crude and refined products.

Pure Oil's automotive products are sold through over 16,000 dealers in 32 states. Best known to motorists are Purol-Pep gasoline, and its twin product Woco-Pep . . . Tiolene, the 100% super-Pennsylvania Motor Oil . . . Pure Oil lubricants. Most Pure Oil Dealers also handle Yale Tires, Pure Batteries, and a complete line of approved accessories.

THE PURE OIL COMPANY, U. S. A.

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"BE SURE WITH PURE"

Lubricating Oil Properties Are Improved Electrically

Utilizing the physio-chemical changes that come in molecular structure to lubricating oil particles when passed between electrodes maintained under a high electric potential, the Societe des Huiles DeCavel and Roegiers, in its plant at Ghent, Belgium, is manufacturing motor oils and a motor oil additive of unusually favorable characteristics. The benefits derived from use of the Electro-ionic process are similar to those when processing the oil by solvent extraction.

Since manufacturing these oils involves the use of a basic theory not generally known among oil refiners, particularly those operating in the United States, the brief description of the theory as advanced by the company technologists is repeated here, as, "When a gas is subjected to the action of a very high-tension electric current, the atoms of which it is composed are split into electrons and ions. The mass of an electron is only about one two-thousandth that of an atom of hydrogen, so the minuteness of the individual electron can hardly be appreciated. It is possible to make these electrons and ions vibrate with tremendous velocity when placed in an electric field charged at a high potential. When a molecule of oil is placed in the path of these vibrating particles, the molecule is bombarded by thousands of these moving particles and the result is a change in the nature of the oil particle itself."

To the physicist de Hemptinne, a professor at Louvain University, goes the credit for having undertaken a profound study of the phenomena, and these studies were continued and the practical application of the theory worked out by the Societe des Huiles DeCavel et Roegiers laboratories. This later resulted in establishing the manufacturing plant of the company that bears this name. The plant manufactures lubricants which are marketed under the trade name "Elektrion" and also manufactures a motor oil concentrate or additive for blending with other lubricants, the additive bearing the trade name "Elektrion R."

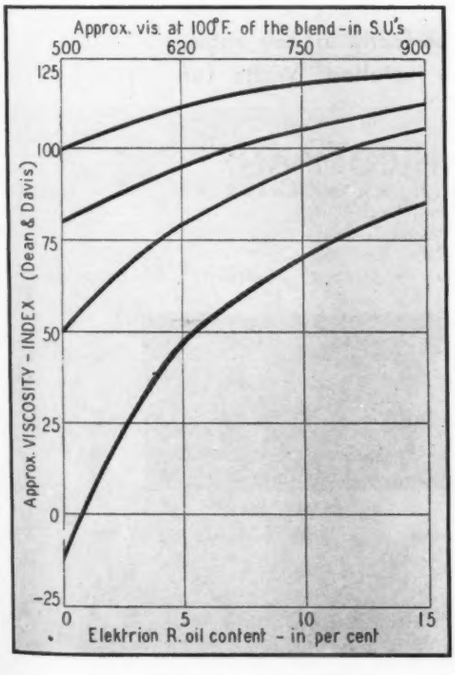

Fig. 2—Rise in V. I. on medium oil

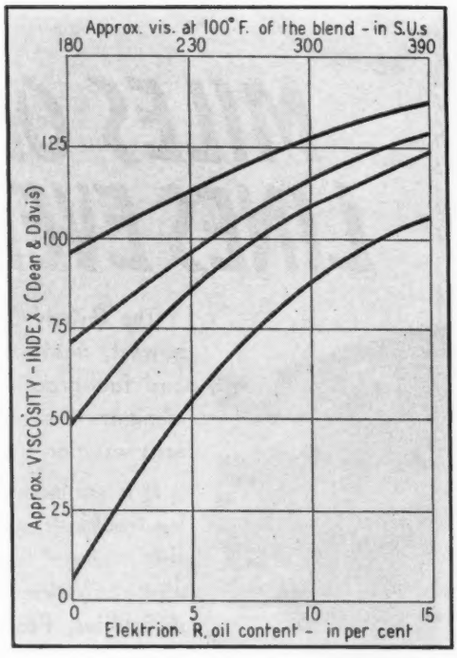

Fig. 1—Rise in V. I. on light oil

When the motor oils first appeared on the market, their saponification number and emulsifying properties were not especially favorable. The experience gained at that time revealed troubles analogous to those often experienced when compounding oils of dissimilar nature. These troubles have been eliminated, however, and the special motor oils are being used in larger quantities daily in most important services, particularly in aviation circles. The additive or concentrate, "Elektrion R," is not so well known as it is a more recent development and the characteristics of the material and the characteristics of the blends of additive and other oils are of most immediate interest. To this end typical laboratory test results have been included here and some of these results are indicated in graphic form here also. The concentrate has the following approximate characteristics:

Color	2 to 3 N.P.A.
Gravity	21.5 A.P.I.
Remains a liquid at	30° F.
Viscosity at 210° F.	1,000 sec. Saybolt
Open flash	440° F.
Acid No.	1
Saponification No.	90
Conradson carbon	.4 per cent
Ash	Nil

Completely soluble in petroleum lubricants.

When the additive is blended with petroleum lubricants so that the blend represents 5 to 15 per cent of the total, the finished motor oil provides an increase in the viscosity of the lubricant and in addition improves its viscosity index, acts as an anti-sludging agent, improves its "oiliness" and lowers its pourpoint.

For guidance only, when blending the additive, it might be stated that at 210° F., 10 per cent Elektrion R. oil has at least the same effect as adding 30 per cent bright stock of 150 viscosity at 210° F.

V.I. IMPROVED

Due to the exceptional temperature-viscosity curve of Elektrion R. itself, and in accordance with the empirical blending law which governs mixtures of soluble liquids, the viscosity index of the mineral oil blend is increased. Graphic illustration of this is shown in Figures 1, 2 and 3.

ANTI-SLUDGING AGENT

The addition of the additive has a most favorable effect on sludge formation. For example, when heated at 300° F., a conventional 200 red Mid-Continent oil shows sludge formation starting after about six hours. The sludge formation increases rather rapidly. The same oil to which 10 per cent Elektrion R. has been added does not show sludge formation after 200 hours of heating at 300° F. The same results are shown on practically all oils.

OILINESS

Elektrion R. molecules undergo a considerable increase in their original volume during elektrionization. This peculiarity, together with the physico-chemical activity of the Elektrion R. particles (illustrated by their tendency to cling to water particles), might explain partially the increased oiliness of the blends.

DEPRESSES POURPOINT

Although there is no general rule, it may be stated that the ASTM pourpoint is lowered by the addition of even a small percentage of the additive. It never increases the pourpoint.

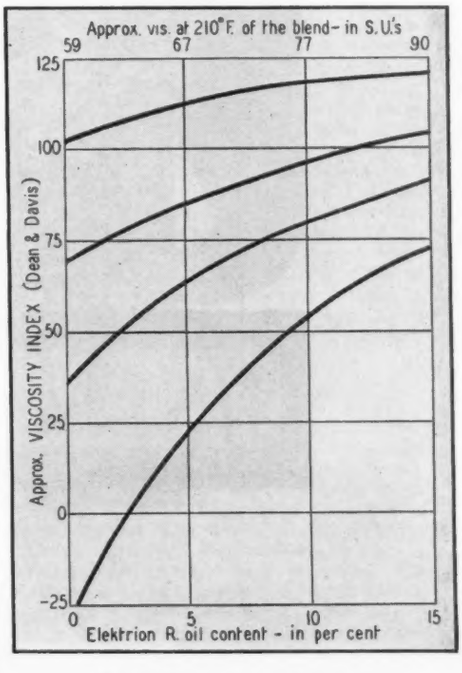

Fig. 3—Rise in V. I. on heavy oil

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Top and bottom rollers take out the whip; side rollers help spool line perfectly.

Even a badly wickered line will not injure rollers due to their tough composition and free spinning action.

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The Grizzly "No-Wip" Line Saver is the newest, neatest, most efficient, compact and fool-proof device ever developed to eliminate the exorbitant expense and hazards resulting from excessive wire line wear.

It is engineered to do a specific job, to be trouble-free, and save money. Its use will minimize wear, hazardous breaks and abuse of wire lines, and solve many line difficulties. Positively eliminates whipping, forces the line to track perfectly, prevents piling up at any area on drum, and simplifies spooling.

Strong, light in weight, made of the finest materials throughout. Can be installed at any point in the derrick, at any height over drum. Functions perfectly at any angle, regardless of how installed. Write for Bulletin No. 10-OF.

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GRIZZLY "No-Wip" LINE SAVER

New Wilshire Treating Unit Handles 5,000 Bbls. Daily

By J. A. ALTSHULER*, F. G. GRAVES† and E. S. BROWN†

A Stratcold acid treating plant of latest design was installed as an integral part of the Wilshire Oil Co.'s new refinery, completed during the year 1936, at Norwalk, Calif.

This plant was designed for the treatment of 5,000 bbls. daily of cracked distillate manufactured in the latest type of Dubbs full-flashing cracking unit from a blend of Huntington Beach and Santa Fe Springs reduced crudes. Contactor-centrifuge treatment at controlled low temperatures was selected to meet the finished product specifications at lowest overall cost.

DESCRIPTION OF PLANT

The basis of design of this plant was a combination of two processes well known in the commercial acid treatment of pressure naphtha: namely, cold treatment and contactor-centrifuge treating. Several unique features as later described, were added to this combination. Figure 1 is an outside view of the plant as a whole with its acid and soda supply blow cases, water wash, and soda neutralization equipment. The plant is divided into two parts, one housing the refrigerating equipment, as shown in Figure 2, and the other the contactor-centrifuge acid treating equipment which is shown in Figure 3.

The treating system may be readily followed from a flow sheet of the plant, Figure 4. Briefly, the process is one of three-stage counter-current flow in which contactors are used for intimately dispersing and contacting sulfuric acid with the naphtha to be treated, and centrifuges are used for rapid separation of the treated naphtha from the acid sludge. Both of the preceding operations are carried out under controlled low temperature conditions, the heat of reaction being absorbed in the contactors as created.

To obtain most efficient treating results, this plant has been equipped with automatic control instruments for regulation of the naphtha feed to the unit, the acid and caustic soda feeds, and the temperature at which treatment takes place. Foxboro stabilog control instruments have been used throughout, with control valves especially designed to operate on small quantities of chemicals. The method of temperature control will be included in a later description of the refrigeration cycle. Figure 5 is a reproduction of a typical chart showing the control of acid fed to the system, and Figure 6 is a typical temperature control chart showing the uniformity of regulation.

For the dispersion of the acid and its adequate contacting with the naphtha to be treated, high-dispersion refrigerating contactors are used. Mechanical energy is used in these machines to impart high velocity to the materials to be contacted and full advantage is taken of a plurality of changes of velocity and direction within the machine. The heat of reaction between naphtha and acid is absorbed, as created, by a tube bundle installed in the end of the machine. The cooling is provided by direct expansion of ammonia. A cross section of the contactor is shown in Figure 7.

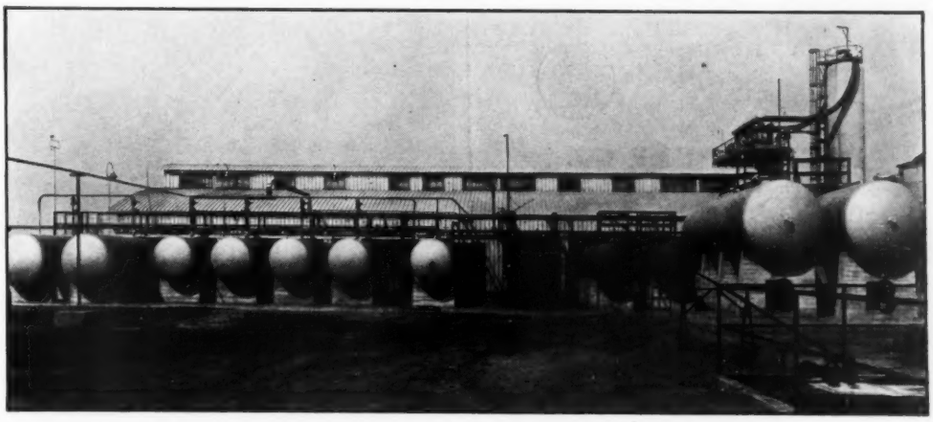

Fig. 1—Exterior view of Stratco treating plant in Wilshire plant showing water washers, soda settlers and blow cases

As a means of effecting immediate separation, the mixture flows from the contactor in each stage to four Stratco C-10 centrifuges (The National Acme Co. of Cleveland, Ohio) which operate in parallel. A fifth centrifuge is provided in each stage as a spare. The centrifuges are direct driven by Louis Allis explosion-proof motors of special design and operate at a synchronous speed of 750 r.p.m. To operate at this synchronous speed, high-frequency electric current is required. This is manufactured by a frequency changer included in the plant for this purpose. The centrifuges, shown in cross section in Figure 8, are totally enclosed and vapor tight.

SPECIAL PUMPING EQUIPMENT

Owing to the nature of materials being handled; i.e., separated naphtha and acid sludge, special pumping equipment is necessary to make possible interstage and final pumping without vapor binding. Vertical centrifugal pumps are employed (cross section, Figure 9) in which it is possible to satisfactorily vent the vapor released in the eye of the impeller to a vapor recovery system. The vertical pump is particularly applicable to this type of service, since none of the acid bearing materials are in contact with the stuffing box, which is in contact only with vapor under suction pressure. Rate of discharge of the vertical hydrocarbon pumps is regulated by flanged type liquid

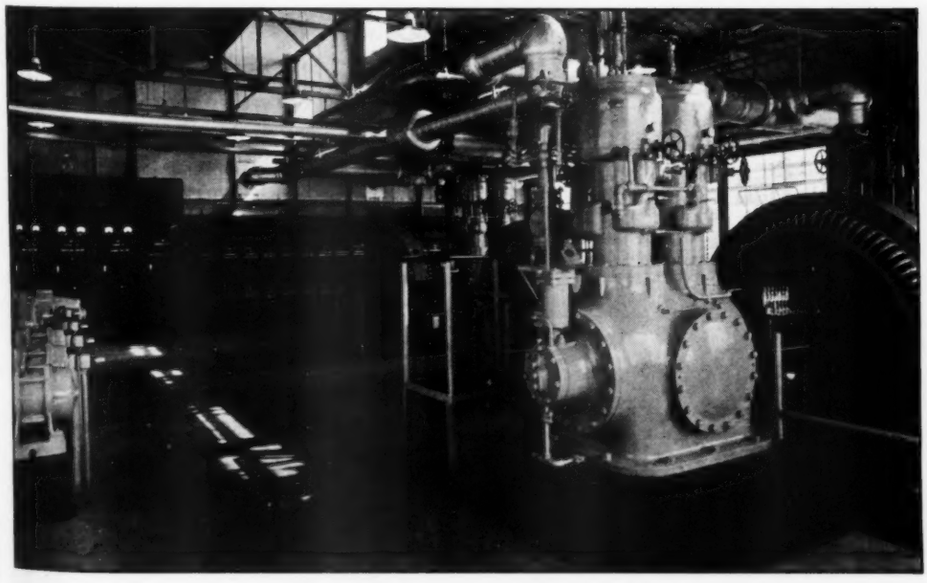

Fig. 2—Inside the ammonia refrigerating plant

*Vice president, Stratford Engineering Corp. †Research & development department, Standard Oil Co. of California.

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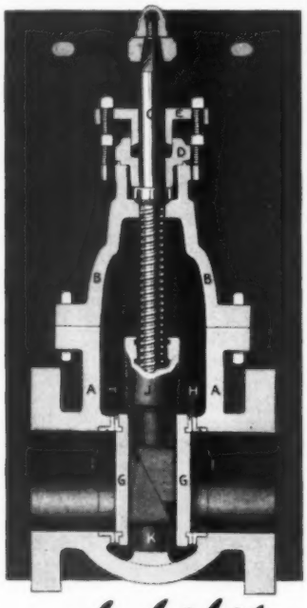

Dependability

Ludlow valves have established an enviable record of dependability. Working at continuous high pressures on oil and gas lines, these valves give rugged performance for periods of 30 or more years.

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TROY, NEW YORK

level controllers with which they are equipped.

The Wilshire treating plant was designed with very careful consideration given to providing optimum controlled temperature with least possible expenditure for ammonia refrigeration.

The refrigerating contactor makes it possible to absorb the heat of reaction as evolved, thereby raising the temperature level at which this quantity of heat is absorbed, resulting in an increased suction pressure on the refrigerating machinery. Elevated suction pressures of the compressors make possible increased capacity in tons of refrigeration per machine and materially reduce the electric power requirements per unit of refrigeration. To further reduce the power requirements, spray-type chillers were installed to provide excess transfer surface over the amount that it is feasible to install in the contactors. Vertical pumps of the same design, as described for the interstage distillate and sludge pumps, circulate liquid ammonia through the cooling surface of the refrigerating contactors, after which the same liquid ammonia is used to spray-cool the distillate passing through the coils of the chillers. The vapor from both chiller and contactor is released to the suction of the compressor through a vapor-liquid separating head in the top of the chiller. The desired temperature of the acid-naphtha mixture leaving the contactor is automatically maintained by a Foxboro stabilog recording temperature controller. The valve of this instrument regulates the ammonia evaporation pressure within the chiller and consequently the temperature of the liquid ammonia circulating through the system.

Four York vertical ammonia compressors, with accessory equipment, do the refrigerating work required in this installation. They are arranged so that, under full design operating conditions, one pair of compressors driven by a common synchronous motor provides the refrigeration required in the first and second stages of the treating plant. The other two compressors, individually synchronous motor driven, operate on the third stage (the fresh acid stage where highest temperature rise occurs). The compressors are built so that a portion of their capacity may be by-passed, if desired, and they are manifolded to make possible most efficient and flexible operation at varying throughput and acid rates.

Full advantage is taken of the low temperature of the outgoing treated naphtha by a battery of heat exchangers for reduction of the temperature of the charge to the plant to within approximately 15° F. of the temperature of the outgoing oil. The

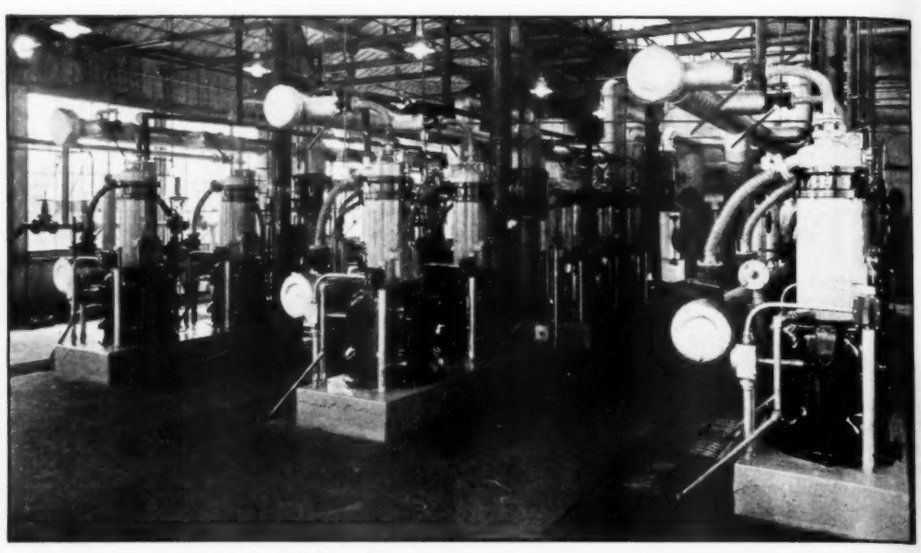


Fig. 3—Centrifuges, contactors and chillers

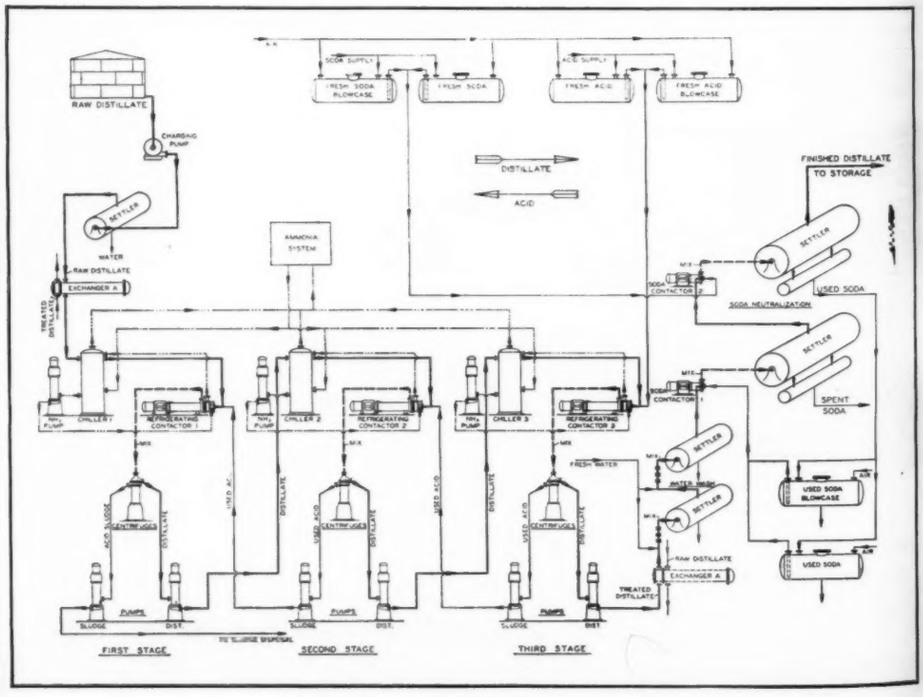
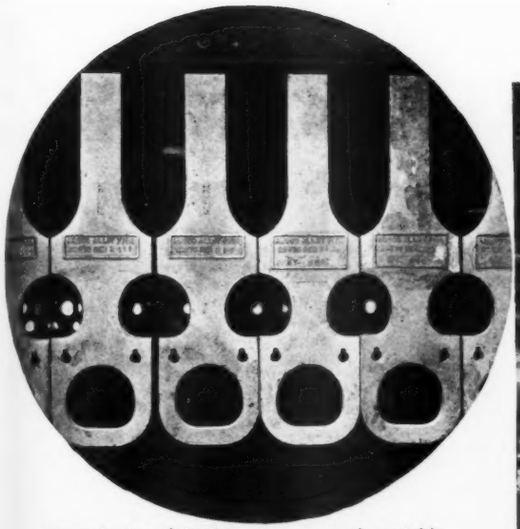
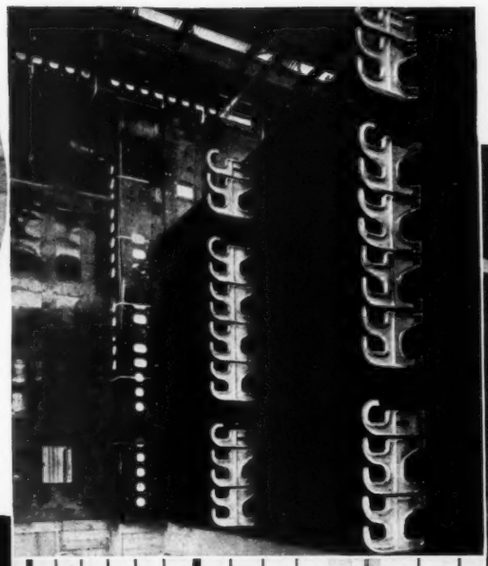
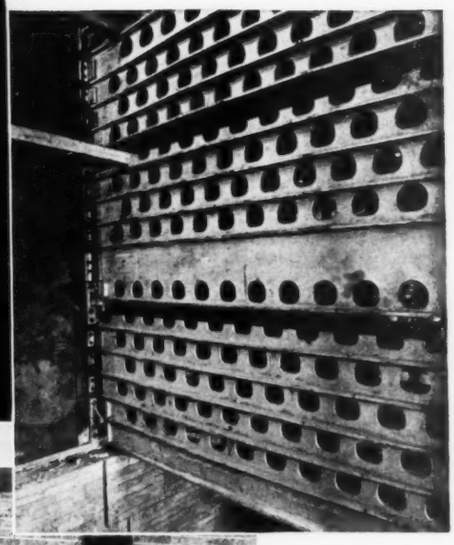


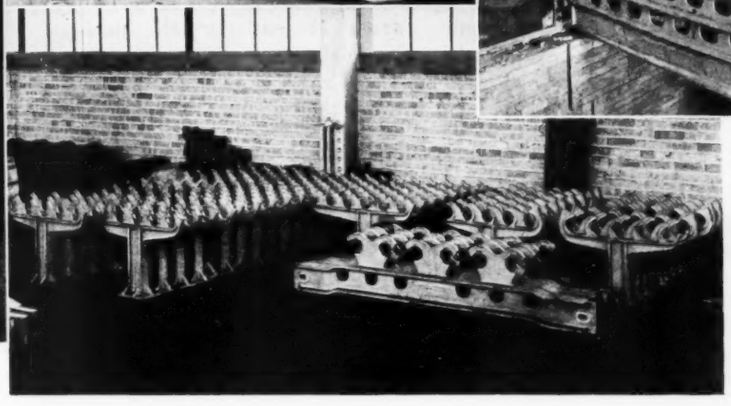
Fig. 4—Flow sheet of Wilshire treating plant



Seventy-five tons of AMSCO Alloy was recently erected in three stills by a Mid-Continent Oil Refinery. AMSCO Alloy does not crack, bend, scale, warp or burn.

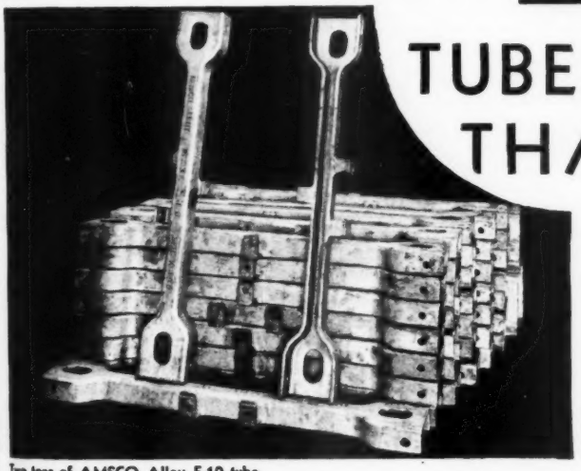






AMSCO Alloy tube sheets, roof hangers, channels, angle stiffeners, support brackets, hangers and sight box extensions are in daily use throughout the oil industry.

A small emergency shipment of AMSCO Alloy F-10 tube supports for use in a Texas refinery.



Two tons of AMSCO Alloy F-10 tube supports, I-beams and pins for a prominent mid-western refinery.

TUBE SUPPORTS THAT ENDURE

are tube supports of AMSCO Alloy. Records are available showing over eight years of service, operating 97% of the time, and still in use.

And this same economical service is given by channels, hangers, end sheets, sight box extensions, and other still parts of AMSCO Alloy.

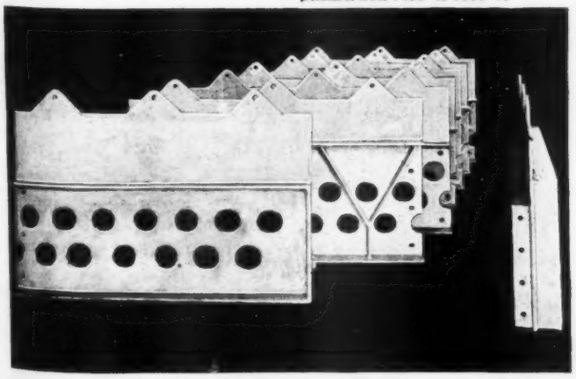
AMSCO Alloy affords great resistance to the corrosive action of sulphur gases and temperatures up to 2000° F. Properly applied, *it does not crack, bend, scale, warp or burn.*

AMSCO Alloy is cast into any shape or size of part, is readily machined, extremely durable, and proved by numerous installations involving the use of hundreds of tons of cast parts.

Specify AMSCO Alloy for longer service and freedom from maintenance worries on all still castings subjected to high temperatures and the corrosive action of gases.

May we furnish you with details on how AMSCO Alloy will cut your still operating costs?

An installation of AMSCO Alloy hangers has been in service since 1928 under temperatures from 1400° to 1600° F.



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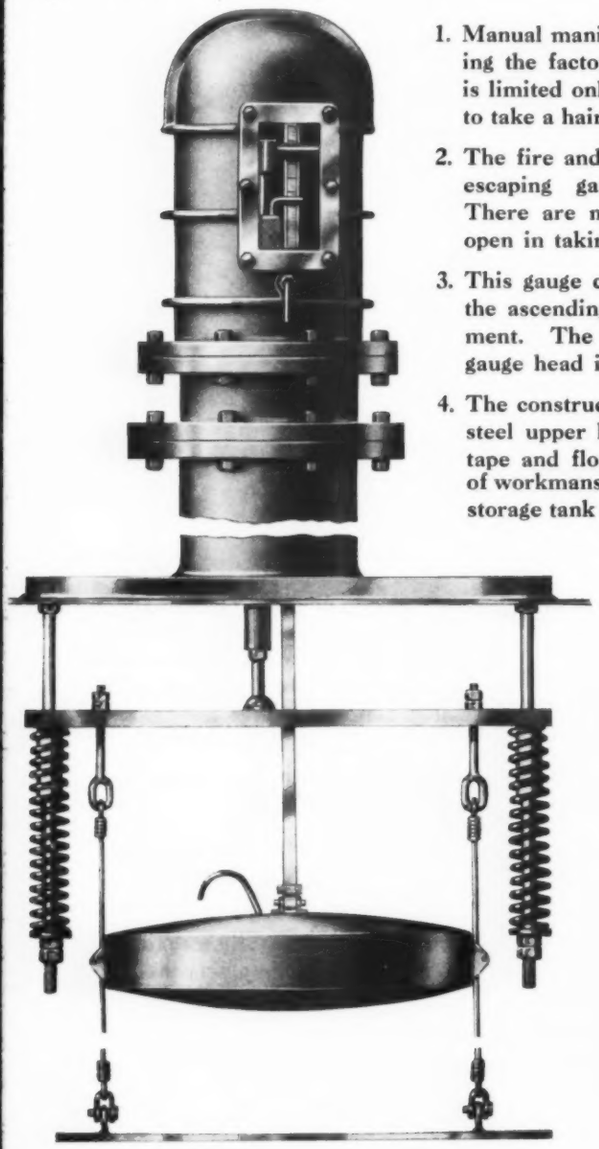
S&J Compensating Gauge for Hortonspheroids

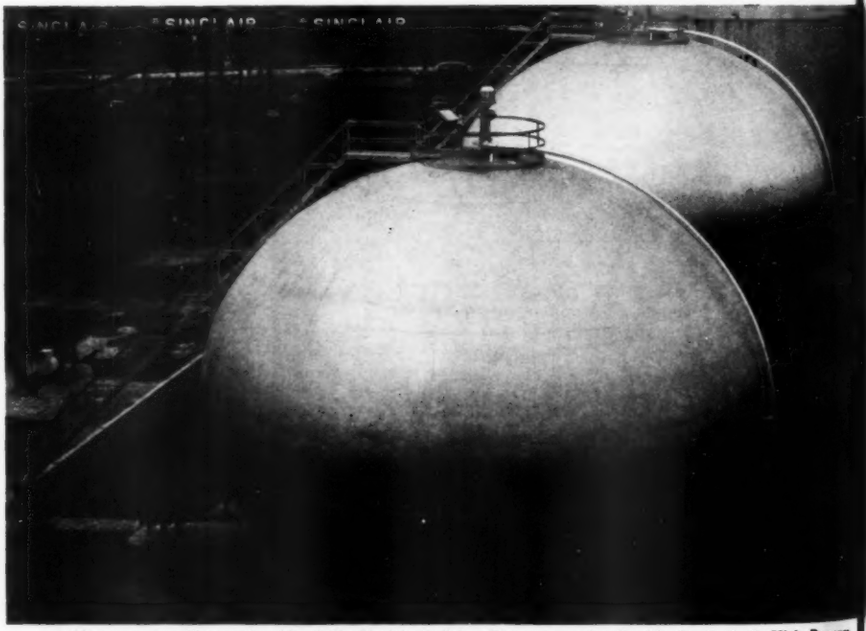
With an increasing tendency of refiners to adopt spherical and spheroidal tanks for their new and higher pressure storage, necessity again becomes the mother of invention in providing suitable fittings for the new type tanks.

The compensating automatic gauge for spheroidal tanks, illustrated below, is one of the new and patented devices offered by S. & J. to meet the new requirements of measuring of storage, and conservation of gases held under high pressure. The compensating automatic gauge provides these advantages:



1. Manual manipulation is eliminated, reducing the factor of human error. Accuracy is limited only by the ability of the gauger to take a hairline reading of the tape.
2. The fire and explosion hazard incident to escaping gases is entirely eliminated. There are no valves or gauge covers to open in taking a reading.
3. This gauge compensates automatically for the ascending and descending roof movement. The compensating device in the gauge head is covered by patents.
4. The construction incorporates cast iron or steel upper housings, KA-2 stainless steel tape and float, and the same high quality of workmanship characteristic of all S. & J. storage tank equipment.

A close-up view of the S. & J. Compensating Automatic Tank Gauge and Still Type Breather Valve installed on the Hortonspheroids shown below.



Above are two Hortonspheroids of the Sinclair Refining Company, equipped with the S. & J. High Pressure Fittings shown in the picture at the top.

OTHER NEW PRODUCTS

In addition to the new S. & J. Compensating High Pressure Gauge for Hortonspheroids shown above, our line of gas tight fittings designed especially for Hortonspheroids and Spheres includes an automatic gauge for Spheres, a Still Type Breather Valve, an Instrument Pressure Lock for sampling and recording temperatures, and a weighted gauge hole cover. Other tank fittings for use below the liquid level are illustrated and described in our Catalog No. 52-B. Write for your copy of this book.

SHAND & JURS CO.
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SHAND & JURS

acid treated naphtha leaving the heat exchangers is thoroughly water washed in two-stage Everdur bronze water washing equipment and neutralized by means of two-stage soda application; in the latter operation, intimate contact is assured by the use of standard Strateo contactors.

OPERATING RESULTS

After the completion of the acceptance test runs in August, 1936, through the courtesy of the Wilshire Oil Co., arrangements were made to conduct a series of test runs covering a wide range of operating conditions.

The purpose of this program was to make a study of the effect of variables in plant operation on treating efficiency, stock losses, and reagent and utility requirements. A careful record was kept throughout of all operating conditions, temperatures, pressures, etc. Continuous composite samples of raw and treated stocks were taken during each test. Owing to the difficulty of segregating, in the refinery, stocks of any individual test run and for the sake of uniformity, all redistillations were made in the laboratory, using standard methods known to check commercial redistillation operation. The following is a brief discussion of the results obtained, facts established, and conclusions drawn from the test program.

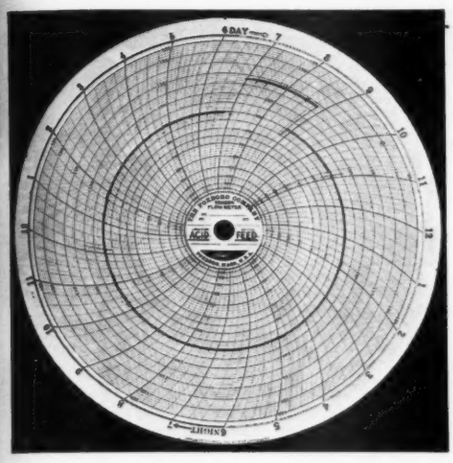


Fig. 5—Chart of fresh acid feed

EFFICIENCY OF TREATMENT (DESULFURIZATION-GUMS-COLOR)

Typical results on treatment of a representative raw naphtha, containing 0.40 per cent sulfur, are illustrated in Figure 10. It will be noted in this figure that in addition to the desulfurization required, plus 30 Saybolt color was obtained with 5 pounds of 98 per cent H_2SO_4. Gum content of 10 milligrams (Atlantic refining method) was obtained on the final sweetened gasoline by the use of 3.6 pounds of the same acid. It was also found that 4 pounds of acid were sufficient to give induction periods of over eight hours.

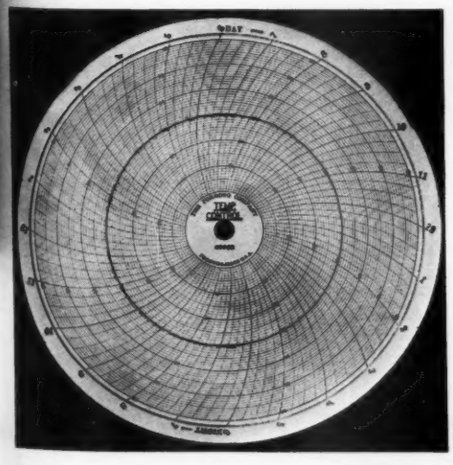


Fig. 6—Temperature-control chart on acid-naphtha mixture leaving contactors

It will be especially noted that the above data resulted from treatment at 30° F. in the first and

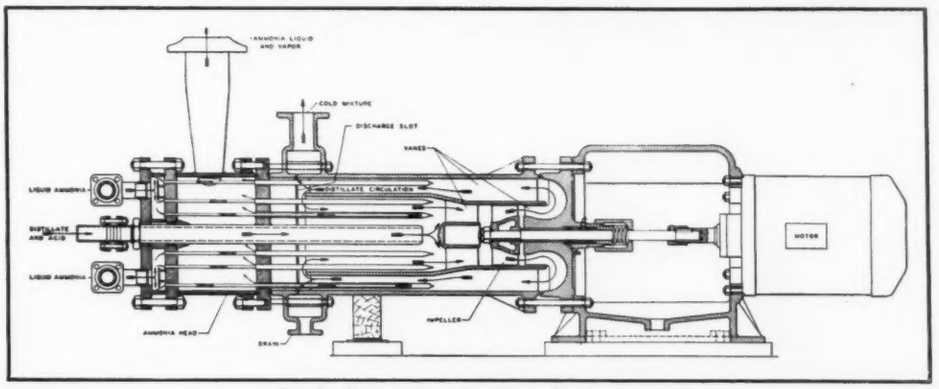
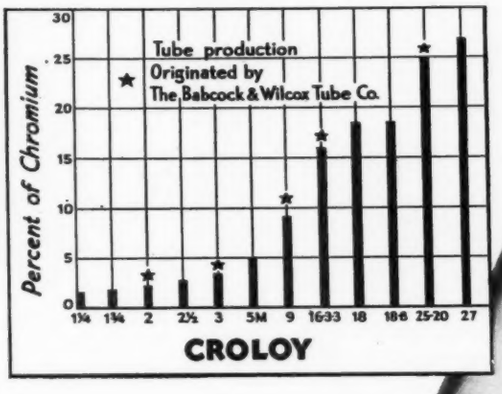
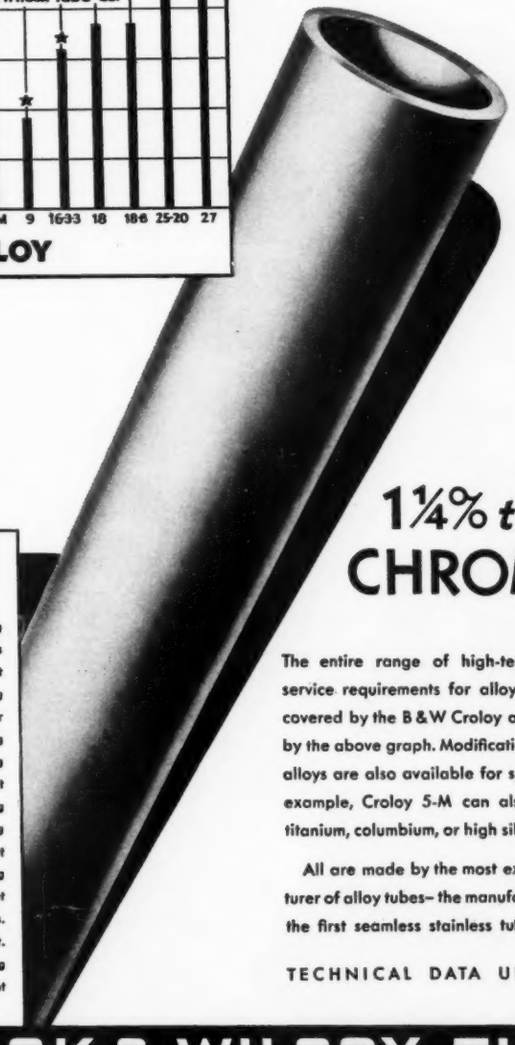


Fig. 7—Cross-section of refrigerating contactor

B & W CROLOY

TUBING AND PIPE FOR REFINERY SERVICE





1¼% to 27% CHROMIUM

The entire range of high-temperature refinery-service requirements for alloy tubing and pipe is covered by the B & W Croloy analyses summarized by the above graph. Modifications of many of these alloys are also available for special purposes. For example, Croloy 5-M can also be supplied with titanium, columbium, or high silicon additions.

All are made by the most experienced manufacturer of alloy tubes—the manufacturer that produced the first seamless stainless tubing in this country.

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HOT FINISHED COLD DRAWN ALLOY STEELS CARBON STEEL

THE BABCOCK & WILCOX TUBE COMPANY, BEAVER FALLS, PA.

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COMBUSTION EQUIPMENT AND SERVICE

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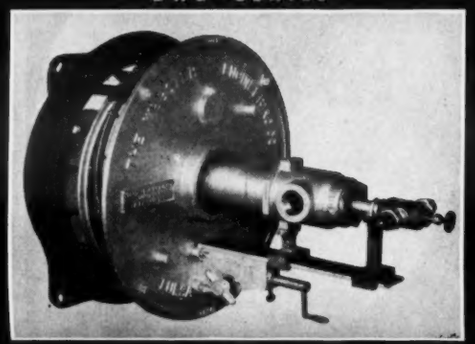

Knowledge of combustion problems as applied to refineries, plus the type of burner equipment used, enables us to solve any refinery combustion problem. The Webster Guarantee of complete satisfaction is behind each installation.

A complete survey of your plant can be made at a nominal cost.

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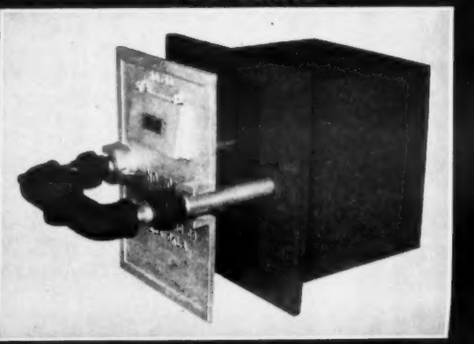


second stages and 20° F. in the fresh acid stage. The commercial tests have definitely established the advisability of operating this plant at these temperatures for lowest overall operating cost for a given quality of finished product.

VOLUMETRIC TREATING LOSSES

Figure 11 is a graph of volumetric treating loss, expressed in percentage of the charge, against acid rate. The data, obtained from gauges between the feed tank and the run tank for acid treated naphtha, are average figures. In reality, loss figures necessarily include any losses by evaporation from the raw feed tank as well as from the treated distillate run-down tank. The curve therefore represents a loss which is the sum of actual volumetric treating loss plus loss by evaporation. It is naturally well understood that treating loss is a function of the character of the distillate, the

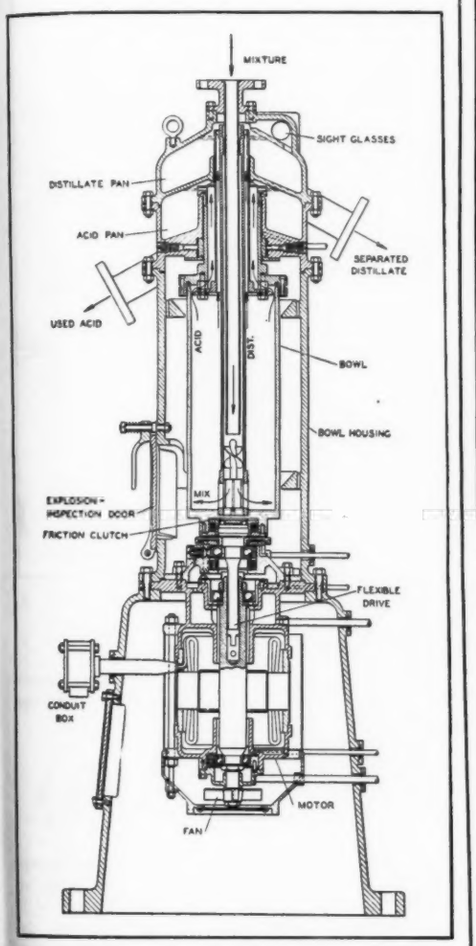


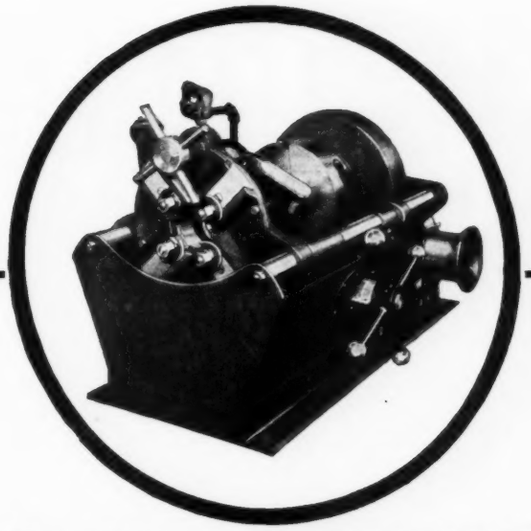
Fig. 8—Cross-section of Stratco centrifuge

quantity of acid used for treatment, and the temperature at which treatment is carried out. That volumetric treating loss increases materially with increase in treating temperature is clearly shown by the curves for treatment at 40-40-30° F. and 60-60-60°.

It should be emphasized at this point that data shown for treatment at 60-60-60° F. in the three stages represent the result of treatment controlled at a maximum of 60° F. by means of ammonia refrigeration. Had controlled temperatures not been used, maximum temperatures of 120° F. to 150° F., depending on the acid rate, would have been reached. It is obvious that had no control been used the losses accompanying such high temperature of treatment would have been many per cent higher than those shown in Figure 11 for treatment at 60-60-60° F. The fact that at high uncontrolled temperatures much more acid is required for a given treating result further accentuates the advantage of controlled temperature.

POLYMERIZATION LOSSES

Polymerization loss vs. acid rate, as shown in Figure 12, represents the degradation of endpoint



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Two models—Standard equipped with separate non-opening die heads and dies for each size. Super equipped with quick-opening die heads and dies.

Super threads 2" pipe in 22 seconds. 2" pipe is cut off in 8 seconds.

Four blade cutter head. Cone-type fluted reamer. Safety friction gear—prevents overload. Direct gear drive. ½ H.P. 110 volt Universal Motor.

The most for the money in pipe machines. See the No. 999 or write for full particulars. A "TOLEDO" No. 999 will solve your problem of cutting and threading small pipe.

THE TOLEDO PIPE THREADING MACHINE CO.
TOLEDO, OHIO NEW YORK OFFICE, 72 LAFAYETTE STREET

"TOLEDO"

A "TOLEDO" SERVES BEST

Valves

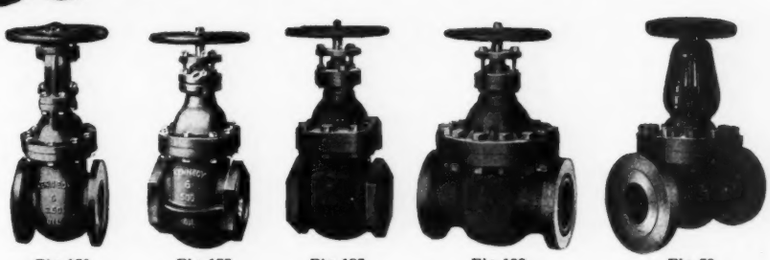

Fig. 170 400-lb. Test | Fig. 177 1000-lb. Test | Fig. 187 700-lb. Test | Fig. 192 1600-lb. Test | Fig. 79 2500-lb. Test

for every pressure in the oil and gas industries

A FULL range of sizes for low, moderate, high and extreme pressures are included in the large Kennedy line of valves for oil and gas industry services. Each type is specially designed for the particular requirements of the service for which it is intended, with a large factor of strength and with many special features of design that assure trouble-free service and long life.

The Kennedy Valve Mfg. Co., Elmira, N. Y.

KENNEDY
VALVES-PIPE FITTINGS-FIRE HYDRANTS

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DUSTOP

REPLACEMENT-TYPE

Air Filters

reduced this wear

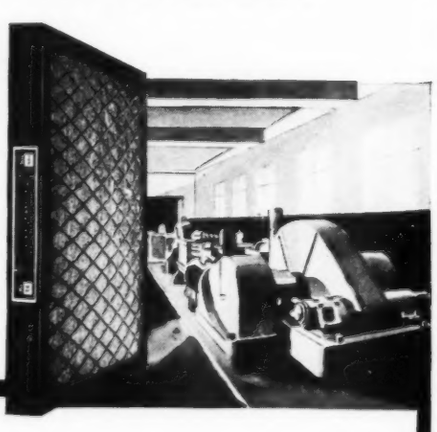
to this...

and Saved

Thousands of Dollars!

● In actual performance in America's "dust bowl," Dust-Stop Replacement-Type Air Filters on thirty-five 1250 h.p. engines, caught and *held* sufficient abrasive dust to reduce engine wear from .006" to .001" per thousand engine hours. Since engines must be reconditioned when cylinder walls have worn .015" to .016", this means that Dust-Stop equipped engines, in pipe line use, have run 15,000 engine hours, before reconditioning was necessary. In other words, Dust-Stop Air Filters not only permitted the continuous operation of the thirty-five engines, but lengthened by *six times* the periods between shut-downs for reconditioning.

In still other words, fill in the form below, attach to your letterhead and mail today. Our reply will tell you how, and how much it will cost, to reduce losses due to wear caused by abrasive dust. Owens-Illinois Glass Company, 309 Madison Avenue, Toledo, Ohio.



OWENS-ILLINOIS GLASS COMPANY
Industrial and Structural Products Division
309 Madison Avenue
Toledo, Ohio

DATE _____

Please send us description and quote price on DUST-STOP Enclosed Filter Unit for:

GAS ENGINE
Make _____
Bore _____ in. Stroke _____
No. Cylinders _____ RPM _____
☐ Two-cycle ☐ Four-cycle
☐ Single-acting ☐ Double-acting
Size and type of intake _____

AIR COMPRESSOR
Make _____
Bore _____ in. Stroke _____
No. Cylinders _____ RPM _____
☐ Single-acting ☐ Double-acting
Size and type of intake _____

DIESEL ENGINE
Make _____
☐ Plain-Scavenging . . . . (Enter under "Gas Engine")
☐ Super-Scavenging . . . (Enter under "Gas Engine")
☐ Super-Charged . . . . . (Enter under "Compressor")

gasoline to hydrocarbons of higher molecular weight and boiling points above the gasoline range, and is separate and distinct from the volumetric

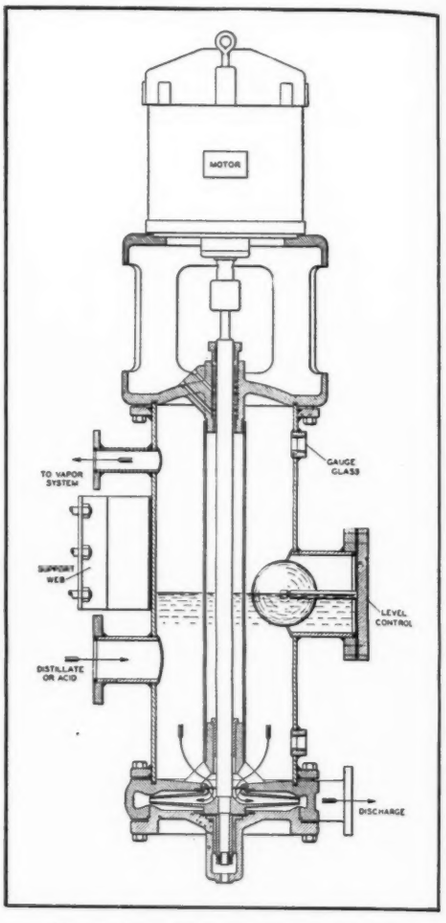


Fig. 9—Cross-section of vertical receiver-type centrifugal pump

treating loss shown in Figure 11. All polymerization losses were calculated in accordance with the following formula:

$$100 \times \left(\frac{\%\text{ gasoline in raw naphtha} - \%\text{ gasoline in treated naphtha}}{\%\text{ gasoline in raw naphtha}} \right)$$

The gasoline content in each case was determined by the actual measurement of endpoint gasoline produced in a glass laboratory still equipped for highly efficient fractionation. To eliminate, as far as possible, the errors of the A.S.T.M. distillation, yields for a given endpoint were selected from a curve established by distillation to three different endpoints. The detrimental effect on polymerization loss of treatment at higher temperatures is also shown in Figure 12. Here again, as in the case of volumetric treating losses, it should be pointed out that the temperatures were all controlled at the values shown. Elimina-

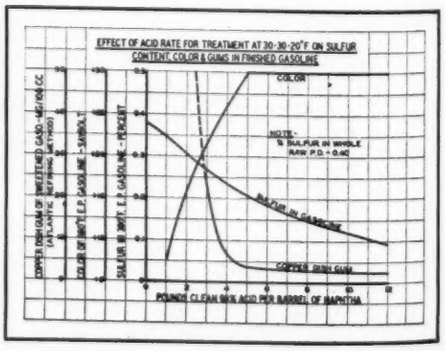

EFFECT OF ACID RATE FOR TREATMENT AT 30-30-20°F ON SULFUR CONTENT, COLOR & GUMS IN FINISHED GASOLINE
COLOR
NOTE:
% SULFUR IN WHOLE RAW P.D. = 0.40
SULFUR IN GASOLINE
COPPER DISH GUM
POUNDS CLEAN 66% ACID PER BARREL OF NAPHTHA

Figure 10

MIDWEST WELDING FITTINGS

improve piping design and reduce costs

Among the many reasons for the growing popularity of Midwest Welding Fittings are: (1) The longer tangents available only on Midwest Welding Ells reduce installation time and expense, in addition to saving pipe. (2) Midwest Van Stone Nipples have a heavy forged lap with large radius fillet and square corner. (3) Midwest Saddles compensate for weakening of header body resulting from metal removed for neck opening. (4) Midwest Shaped Nipples eliminate all layout and templates when saddling one pipe upon another. Etc., etc. Ask for a copy of the new Bulletin WF-36.

MIDWEST
PIPING & SUPPLY CO., Inc.
1450 So. Second St. ST. LOUIS, MO.

Plants: St. Louis, Passaic (N. J.) and Los Angeles • Sales Offices: Chicago—946 Marquette Bldg. • Houston—1716 Second Nat. Bank Bldg. • Los Angeles—520 Anderson St. • New York—(Ballwood Div.) 30 Church St. • Tulsa—533 Mayo Bldg.

tion of temperature control and the resulting excessive temperatures would have caused a marked increase in polymerization losses for a constant acid rate and a still greater increase for the same degree of refinement.

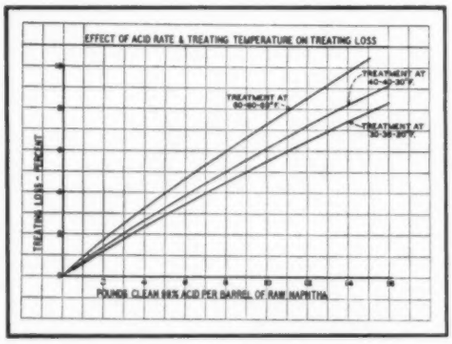

EFFECT OF ACID RATE & TREATING TEMPERATURE ON TREATING LOSS
TREATING LOSS - PERCENT
POUNDS CLEAN 98% ACID PER BARREL OF RAW NAPHTHA
TREATMENT AT 60-60-60°F.
TREATMENT AT 30-30-30°F.

Figure 11

DEGRADATION OF OCTANE NUMBER

All octane number determinations were made by the C.F.R. motor method with humidity control. The engine was periodically checked for accuracy. All knock ratings were taken from a curve of knock rating vs. endpoint established by determinations on gasolines of three different endpoints. Loss of octane number for various rates of acid treatment is shown in Figure 13. The very low loss in octane rating, even at high acid rates and treating temperatures as high as 60-60-60° F., should be especially noted.

POWER REQUIRED FOR REFRIGERATION

The amount of power required for refrigeration at various acid rates and treatment at 30-30-20° F. is shown in Figure 14. The refrigeration required for treatment at low temperatures is dependent upon the heat of reaction for any given acid rate on any given distillate. This varies widely with the nature of the distillate as determined by its source and conditions under which it was manufactured. Examination of this chart clearly discloses that the cost of refrigeration is very small when compared with the total cost of acid treatment.

NEUTRALIZATION REQUIREMENTS

Low chemical requirements for neutralization are characteristic for naphthas acid treated at low

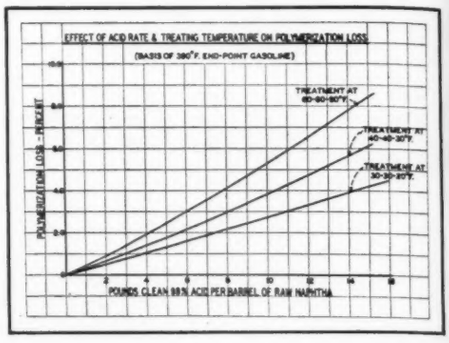

EFFECT OF ACID RATE & TREATING TEMPERATURE ON POLYMERIZATION LOSS
(BASIS OF 380°F. END-POINT GASOLINE)
POLYMERIZATION LOSS - PERCENT
POUNDS CLEAN 98% ACID PER BARREL OF RAW NAPHTHA
TREATMENT AT 60-60-60°F.
TREATMENT AT 40-40-30°F.
TREATMENT AT 30-30-30°F.

Figure 12

controlled temperatures. In the case of this installation, even at acid rates of 15 pounds to the barrel, the caustic soda required for neutralization did not exceed 0.20 pounds per barrel.

CHARACTER OF SLUDGE

The acid sludge from this process is readily hydrolyzable into dilute acid and acid oil satisfactory for use as refinery fuel. A very high percentage of weak acid may be recovered as compared to

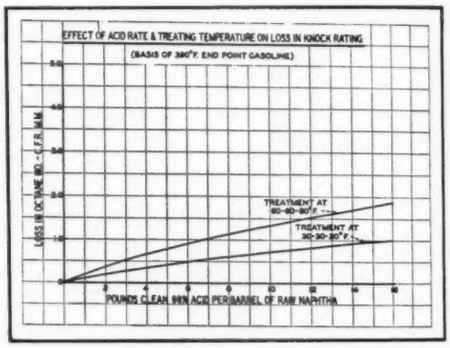

EFFECT OF ACID RATE & TREATING TEMPERATURE ON LOSS IN KNOCK RATING
(BASIS OF 380°F. END POINT GASOLINE)
LOSS IN OCTANE NO. - C.F.R. M.M.
POUNDS CLEAN 98% ACID PER BARREL OF RAW NAPHTHA
TREATMENT AT 60-60-60°F.
TREATMENT AT 30-30-30°F.

Figure 13

the total acid content of the sludge. The content of carbonaceous material is sufficiently low to make possible concentration of this weak acid to usable strength in concentrators of conventional design.

CORRELATION—PLANT VS. LABORATORY

It has been previously well established that there is very definite improvement in efficiency of three-stage counter-current treatment at controlled low temperatures over the best that can be accomplished in the laboratory with a single stage.

The guaranteed performance of the Wilshire treating plant was based on such correlating data,

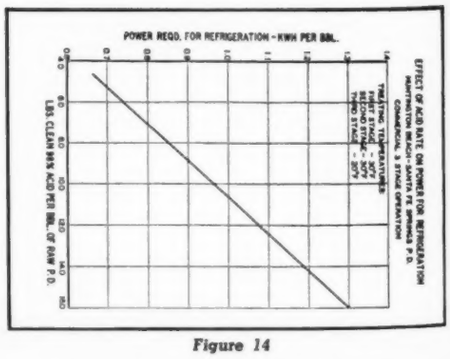

POWER REQD. FOR REFRIGERATION - KWH PER BBL.
LBS. CLEAN 98% ACID PER BBL. OF RAW P.D.
EFFECT OF ACID RATE ON POWER FOR REFRIGERATION
HUNTINGTON BEACH - SANTA FE SPRINGS P.D.
COMMERCIAL 3 STAGE OPERATION
TREATING TEMPERATURES
FIRST STAGE - 30°F
SECOND STAGE - 30°F
THIRD STAGE - 30°F

Figure 14

Monsanto
SELECTIVE SOLVENTS
And Other Chemicals For The Oil Industry

- Phenol
- Cresylic Acid and Cresols
- Muriatic Acid
- Sulfuric Acid
- Caustic Soda
- Chlorine
- Phosphoric Acid and its derivatives

The increasingly wide application of these and other Monsanto products makes them worthy of your attention . . . We shall be glad to discuss your present or potential requirements of chemicals.

Monsanto Chemical Company
St. Louis, U.S.A.

. . . also
SANTOLUBE CC
(A CORROSION INHIBITOR)

At high temperature lubrication, where oxidizing conditions cause bearing metals to corrode, from ¼% to ½% of Santolube CC is effective in oils refined by conventional as well as solvent extraction processes.

CALS OF QUALIT
Monsanto

Pittsburgh's record-breaking flood of 1936 didn't reach the P·DM plant, but it did get into our office building . . . left our entire stock of printed matter a sodden, hopeless mass. We didn't reprint the old bulletins; we started from scratch and *rebuilt* them, from the ground up! It was our loss but *your* gain, because . . .

NOW

EVERY P·DM BULLETIN IS NEW AND CONTAINS THE LATEST DATA AND ILLUSTRATES OUR MOST MODERN EQUIPMENT INSTALLED THROUGHOUT THE COUNTRY.

PITTSBURGH-DES MOINES STEEL COMPANY

THIS COUPON WILL BRING YOUR FILE UP TO DATE

PITTSBURGH-DES MOINES STEEL CO.
Pittsburgh, Pa., 3496 Neville Island; Des Moines, Ia., 997 Tuttle St.; New York, Room 980-99, 270 Broadway; Chicago, 1202 First National Bank Building; Dallas, 1201 Praetorian Building; San Francisco, 603 Rialto Building.
Kindly mail Bulletins checked to address below:

☐ No. 101 Modern Water Storage In Elevated Steel Tanks
☐ No. 102 Standpipes and Steel Reservoirs
☐ No. 103 Steel Tanks for Water Treatment and Gas Service.
☐ No. 202 Steel Storage Equipment for Oil
☐ No. 203 Single Lift Gasholders
☐ No. 301 Steel Construction
☐ No. 303 Pipe Line Bridges
☐ No. 401 All Steel Grandstands
☐ No. 402 All Steel Swimming Pools
☐ No. 502 Tanks, Bins, Etc.
☐ No. 601 Municipal Incinerators
☐ No. 602 Construction Service of Pittsburgh-Des Moines Steel Co.

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which have been further substantiated during the test runs on the plant. This correlation is shown

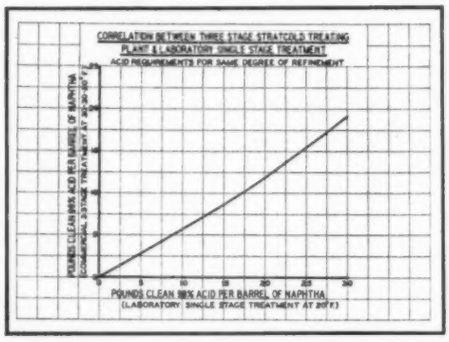

CORRELATION BETWEEN THREE STAGE STRATCOLD TREATING PLANT & LABORATORY SINGLE STAGE TREATMENT
ACID REQUIREMENTS FOR SAME DEGREE OF REFINEMENT
POUNDS CLEAN 98% ACID PER BARREL OF NAPHTHA COMMERCIAL 3-STAGE TREATMENT AT 90°-80°-80° F.
POUNDS CLEAN 98% ACID PER BARREL OF NAPHTHA (LABORATORY SINGLE STAGE TREATMENT AT 20° F.)

Figure 15

in Figure 15. It should be carefully pointed out, however, that such a correlation is applicable only to treatment at low temperatures, and that at normal treating temperatures without temperature control it does not apply. Furthermore, it has been found it is difficult, if not impossible, to duplicate in commercial atmospheric temperature acid treating plants have no temperature control, even with multistage operation, the results to be had in a single stage in the laboratory under the same conditions. In other words, while commercial cold treatment makes possible acid savings of 40 to 50 per cent over laboratory cold treatment for the same degree of refinement, commercial treatment without temperature control requires the same or more acid than the laboratory treatment at comparable temperatures. This means that no laboratory investigation will disclose the advantages of treatment at controlled temperatures without full knowledge of the plant-laboratory correlations involved.

DEMONSTRATED ADVANTAGES OF PROCESS

A report of the operation of this treating plant, as outlined herein, is not complete without calling the reader's attention to the very marked superiority of the results disclosed over those obtainable by any known acid treating method without temperature control, as exemplified by other existing treating installations. Such treatment results in much higher acid requirements for the same degree of refinement, much greater treating and polymerization losses, and substantial increase in loss of octane number.

ACKNOWLEDGMENT

The cooperation of the Wilshire Oil Co. in making these tests possible is gratefully acknowledged.

CRUDE OIL ASSAY DATA

(Continued from Page 86)

or two in between to indicate the spacing of the curves, it is possible to draw in the whole family with reasonable accuracy. Of course, more data

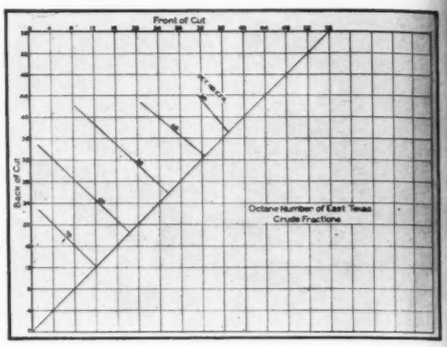
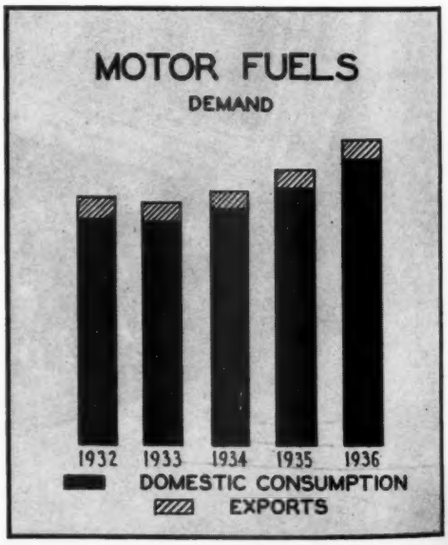


Figure 5

are needed to cover the whole family, as in Figure 1, where there is appreciable curvature and variation in spacing.

Correlation of assay data by this method probably requires more work than is warranted on routine assays, but it is felt that it is worth while to have a single assay of this type made on crudes which are to be processed in major quantities for a considerable period. These would be useful despite minor variations in the quality of the crude from time to time. While it might not be safe to use absolute values from such assays after there was a possibility that the crude had changed somewhat, yet they would serve as a highly satisfactory means of extrapolating any up-to-date but meager data to obtain more complete information regarding all fractions of the crude.



MOTOR FUELS DEMAND U. S.—BBLS.

Year	Domestic	Exports	Total
1936	481,591,000	27,831,000	509,422,000
1935	434,810,000	30,613,000	465,423,000
1934	407,106,000	24,686,000	431,792,000
1933	377,003,000	29,321,000	406,324,000
1932	373,900,000	35,438,000	409,338,000

250,000 *lb. Stock of Chase Tubes*

- **Red Brass**
  85% Copper
  15% Zinc
- **Admiralty**
  70% Copper
  29% Zinc
  1% Tin
- **Arsenical Copper**
  0.35% Arsenic
  Balance Copper

HOW TO DETERMINE BEST TUBE FOR YOUR PARTICULAR PURPOSE

To meet emergencies Vinson Supply carries a 250,000 lb. stock at Tulsa of the three most frequently used Condenser Tubes. Vinson Supply will be glad to send samples of your refinery runs to Chase Research Engineers who, without cost to you, will make a test and tell you which of 15 alloys will best resist your particular corrosive condition.

NOW DISTRIBUTING TUBE-TURNS

Vinson Supply announces that it now has at its Tulsa warehouse a stock of Tube-Turn products including welding flanges. Complete as to sizes and gauges. Standard weight, extra heavy, and light wall are carried.

OHIO RETURN BENDS and FAHRITE TUBE SUPPORTS

Vinson Supply can furnish Ohio Steel Foundry Company's return bends for all tube stills and cracking stills; also Fahrite alloy tube supports, the accepted heat resisting metal for your high temperature problem.

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Refinery Equipment

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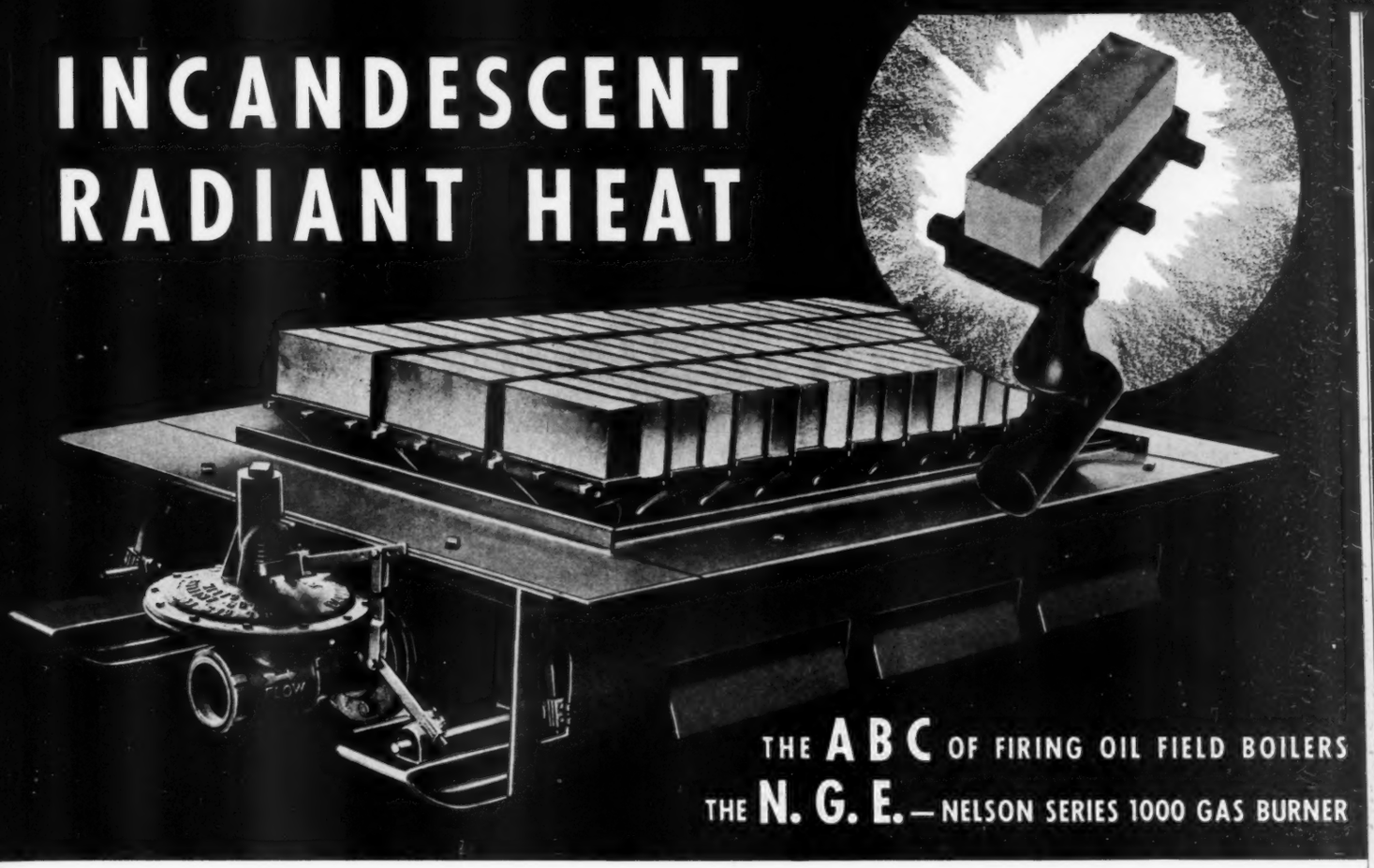

THE A B C OF FIRING OIL FIELD BOILERS
THE N. G. E.—NELSON SERIES 1000 GAS BURNER

INCREASES BOILER EFFICIENCY DECREASES BOILER MAINTENANCE

Today's problem in drilling arithmetic is easy as ABC. Increased steam demands, plus higher capacity equipment, equals greater drilling speed. The factor that simply and successfully solves this equation is the N. G. E.-Nelson Series 1000 Gas Burner.

N. G. E.-Nelson Series 1000 Gas Burners develop maximum rated steam capacities from oil field boilers; and the way it's accomplished is by the perfect application of the principle of incandescent radiant heat. This method of firing boilers has outstanding advantages; first in effectively enhancing boiler efficiency and second in definitely decreasing boiler maintenance.

The Series 1000 Burner consists primarily of a series of manifolded individual burners, each supporting a radiant refractory head. The gas is burned in a restricted and localized zone so that a condition of incandescence is maintained. This causes a tremendous acceleration in the rate of firing, effects uniform heat distribution and rapid heat transfer to heating surface, as well as permitting a greater BTU release per cubic foot of combustion space. Think of these advantages in terms of increased boiler efficiency.

Because the Series 1000 produces a source of heat practically without flame, there can be no direct flame impingement on the crown sheet of the boiler; uniform firebox temperatures are maintained; heat is retained through periods of low boiler loads and less rapid cooling results. Think of these advantages in terms of decreased boiler maintenance.

Write for your copy of a descriptive Bulletin today.

* * * *

SUMMARY OF SERIES 1000 FIELD ADVANTAGES

Safely develops all the steam capacity for which the boiler is rated with low gas pressure.

Complete heavy-duty steel frame eliminates necessity of constructing firebrick combustion chamber.

Full portability permits ready removal and re-installation when changing location of boilers.

Full manifolding flexibility permits installation in any type, size or make boiler without alteration.

Improved Damper Operator provides controlled combustion with accurate air-gas proportioning.

LOOK TO THE PIONEERS FOR CONTINUED LEADERSHIP

NATURAL GAS EQUIPMENT CO. OF TEXAS

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Natural Gas Equipment, Inc. — Los Angeles, San Francisco, California

Petroleum Refining

Capacity of Active Plants Now Highest in Industry's History

By D. H. STORMONT

Despite a decrease in the number of refineries and in the total refining capacity of these plants, the capacity of operating refineries in the United States continued to show an increase during 1936. On March 1, 1937, there were 602 refineries located in the United States, of which 471 were in operation; representing a decrease of 38 in the total number of operating refineries and a decline of 9 in the number of active plants. The total refining capacity of these plants on that date was 4,266,260 bbls. daily and the capacity of operating plants 4,031,660 bbls. daily. While the daily crude capacity of refineries is slightly less than the record high established in 1935, the charging capacity of the active plants advanced to the highest point of the industry's history.

This growth in active refining capacity may be best accounted for by the large amount of additions to present operating plants, the resumption of activities in plants formerly shut down and the building of a few large, modern refineries. During the past year refiners in all sections of the country have been modernizing and making long delayed replacements in their equipment. A great majority of the large refineries and many of the smaller plants underwent remodeling programs during the past year, old obsolete equipment being replaced by modern type units of greater efficiency and capacity. This factor probably serves to account for the greater part of the increase in active refining capacity.

A study of the table shown on page 144 shows that Texas easily maintained its first place in both number of plants and in refining capacity. One year ago Texas was credited with having a total of 201 refineries, 136 of which were in operation. In the matter of plant capacity the state was credited with a total of 1,193,140 bbls. daily, of which 1,036,945 bbls. was being utilized. On March 1, 1936, Texas accounted for 190 of the total number of plants, 130 of which were in operation, had a total daily crude-charging capacity of 1,232,540 bbls. daily and an operating plant capacity of 1,128,450 bbls. daily. It may be seen that while the number of plants declined, the total refining capacity increased by about 37,000 bbls. and the active capacity by more than 90,000 bbls.

Two general areas in Texas were of outstanding importance in new refinery construction during 1936, the area surrounding Corpus Christi and the North Central portion of Texas with Gainesville as its center. The advantages offered by deep-water terminal facilities, accompanied by the discovery of several fields adjacent to Corpus Christi furnished the incentive for four new plants to be built in the city and several more in the surrounding area.

California, the second largest state in number of plants and in total plant capacity, shows an increase in the total number of plants but a decrease in the number of operating refineries and capacity. A year ago California had 76 refineries (65 operating), a total crude charging capacity of 885,540 bbls. daily and an active plant capacity of 848,440 bbls. daily. Now it has 83 refineries, of which 63 are operating, and a total capacity of 878,310 bbls. daily with an operating plant capacity of 832,960 bbls. These data therefore point out that while several plants were built during 1936 in California, they were in general of small capacity and not of sufficient size to offset the plants dismantled or refining equipment dismantled in the operating refineries.

The refining capacity and number of plants of the other states, with but few exceptions, show but very little change, as might be expected. The general tendency of the year in these states was toward a fewer number of plants and a reduction in refining capacity.

In Oklahoma the total number of plants decreased from 47 to 42, but the number of operating plants remained the same, 33. Total capacity was reduced from 300,620 bbls. daily to 272,720 bbls. daily, and the capacity of the operating plants decreased by about 12,000 bbls. There were no new refineries built in this state during the year and construction activity consisted only of plant modernization and additions to present equipment. The decrease in capacity and number of plants is therefore accounted for by the dismantling of shutdown refineries of small capacity and the closing down of some refineries that were operating the previous year.

Pennsylvania, the third largest state in number of plants and capacity, followed the same trend as Oklahoma in so far as number of plants were concerned, but differed in the matter of plant capacity. The number of plants decreased by five and the operating plants by one. However, additions to the operating refineries served to increase the total processing capacity of the state from 312,550 bbls. daily to 320,500 bbls. and the capacity of the operating refineries from 290,900 bbls. daily to 300,100 bbls.

Illinois, Indiana and New Jersey show practically the same capacity and number of plants as of a year ago, while Kansas shows a slight increase in capacity but a decrease in the number of plants. In Louisiana the number of operating plants decreased by two and the total number by one. The total refining capacity of the state shows a decrease of 20,000 bbls., but the daily capacity of the operating plants remained the same.

In the past year construction of new cracking units in new refineries and additional units added in plants amounted to approximately 260,000 bbls. in the United States. Since the greater portion of this capacity was for replacement of existing equipment, only a small increase was recorded in the total cracking capacity of refineries. On March 1, 1936, the cracking capacity of refineries was 2,130,620 bbls. daily or some 33,000 bbls. less than at the present time.

Notwithstanding the comparatively small growth in cracking capacity during the last three years, it may be noted that the daily output of the plants has greatly increased. During January, 1935, the total output of cracked gasoline from United States refineries was 15,781,000 bbls., according to Bureau of Mines figures. In January, 1936, the output was 17,456,000 bbls., and in January, 1937, was 20,951,000 bbls., or an increase of 33 per cent over the production of 1935. Also pointing to the importance of cracking is the fact that during 1936 the output of cracked gasoline exceeded that of straightrun for the first time in the industry's history.

Several small refineries were constructed in Canada during the past year to increase the daily capacity of Canadian refineries to 147,650 bbls. The cracking capacity of these plants is 73,900 bbls. daily.

The refining capacity and number of plants in Mexico shows very little change from that of 1936, there being at present six refineries operating with a total capacity of 134,000 bbls. daily.

A table showing refinery operation by states is shown on page 144.

Copy

Growth of Refinery Capacity in United States

Year—	Number of refineries	Total crude capacity (bbls. daily)	Number of operating refineries	Capacity of operating refineries (bbls. daily)	Total cracking capacity (bbls. daily)
1914	176	.....	...	.....	.....
1918	267	1,186,155	...	.....	.....
1919	289	1,295,115	...	.....	.....
1920	373	1,530,565	...	.....	.....
1921	415	1,888,800	...	.....	.....
1922	479	2,164,050	325	1,854,590	.....
1924	574	3,046,790	362	2,549,490	.....
1925	584	3,033,682	385	2,680,052	(*)
1926	515	3,068,340	356	2,770,340	980,960
1927	462	3,224,307	328	2,964,427	1,245,980
1928	456	3,426,330	315	3,116,930	1,327,584
1929	463	3,719,550	341	3,454,250	1,487,950
1930	479	3,972,460	362	3,721,360	1,705,299
1931	500	4,164,080	397	3,913,180	1,844,609
1932	510	4,093,370	383	3,665,830	1,954,550
1933	567	4,125,250	424	3,696,410	1,823,521
1934	628	4,243,033	483	3,790,593	1,838,420
1935	687	4,281,694	496	3,815,470	2,126,620
1936	640	4,301,754	479	3,936,535	2,130,800
1937	602	4,266,260	471	4,031,660	2,163,730

*Not available previous to 1926.

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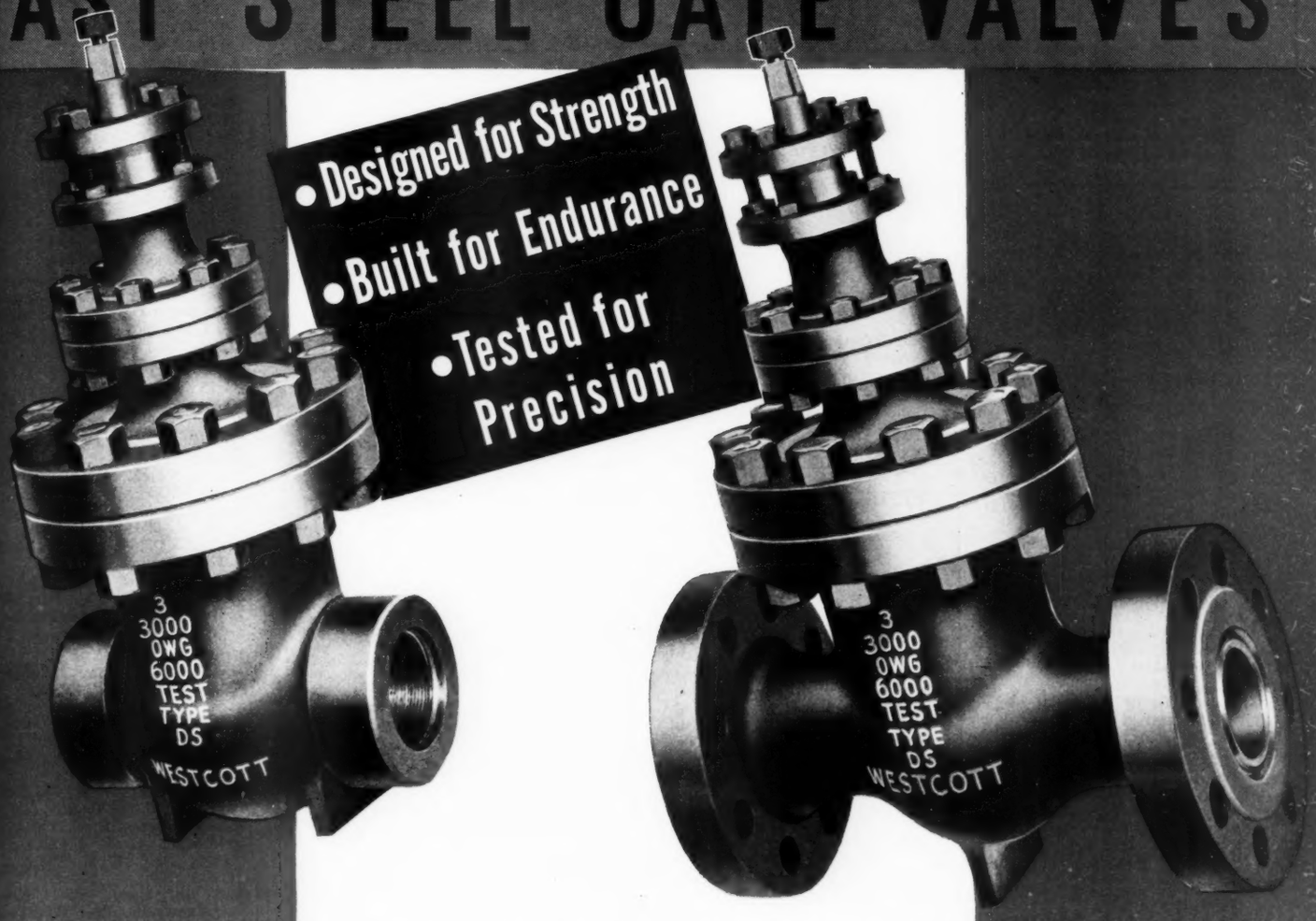

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CONTINENTAL

"Serving the Oil and Gas Industries"

Personnel of Refineries in United States

Abbreviations Used:

Chm. Bd.—Chairman of Board
Pres.—President
V. P.—Vice President
Sec.—Secretary
Treas.—Treasurer
Gen. Mgr.—General Manager
Gen. Supt.—General Superintendent
Sales Mgr.—Sales Manager
Tankcar S. M.—Tankcar Sales Manager
Station S. M.—Station Sales Manager
Pur. Agt.—Purchasing Agent
Traf. Mgr.—Traffic Manager
Ch. Engr.—Chief Engineer
Supt.—Superintendent
Asst. Supt.—Assistant Superintendent
Ch. Chem.—Chief Chemist

A

Aerex Co., The, Bloomfield, N. Mex.
Pres. and Gen. Mgr., A. C. Kittell
V. P., V. A. Kittell
Sec. and Treas., E. H. Kittell
Refinery located at Bloomfield, N. Mex.

Aero Gas Refining Co., Pecos, Tex.
Refinery located at Pecos, Tex.

Aetna Oil Service, Inc., 1202 S. Third St., Louisville, Ky.
Pres., W. R. Abbott
V.P. and Sec., W. T. Davis
Treas. and Gen. Mgr., W. R. Abbott
Tankcar S. M., H. J. Flanders
Service Station S. M., Julius Malkemus
Ch. Engr., Dr. C. M. Alexander
Ch. Chem., Walter Norman
Pur. Agt., E. C. Wolff
Traf. Mgr., H. J. Flanders
Supt., E. E. Van Buren
Refinery located at Louisville, Ky.

Ajax Oil & Refining Co., P.O. Box 168, Clearwater, Calif.
Pres., I. C. Krieger
Sec. and Treas., W. C. Krieger
Gen. Mgr., W. C. Krieger
Gen. Supt. Ref., W. E. Williams
Refinery located at Clearwater, Calif.

Alco Refining Co., P.O. Box 350, Canton, Ohio
Pres., Fred Morgan
V. P.'s, C. L. Wedell; K. B. Montigel
Sec. and Treas., R. D. Morgan
Gen. Mgr., Fred Morgan
Gen. Supt. Ref., C. L. Wedell
Asst. Supt., R. K. Jones
Refinery located at Canton, Ohio
(This company has leased the Canton, Ohio, refinery of Allegheny-Arrow Oil Co.)

Alleghany Refiners, Inc., Genesee Road, Bolivar, N. Y.
Pres., A. L. Shaner
V. P.'s, C. A. Chipman, D. V. McCarthy
Sec., C. A. Chipman
Asst. Sec., H. L. Chambers
Treas., W. A. Hammond
Asst. Treas., H. J. Arnold
Gen. Mgr., H. L. Chambers
Gen. Supt. Ref., H. L. Chambers
Tankcar S. M., H. L. Chambers
Ch. Chem., A. W. Wickham
Pur. Agt., H. J. Arnold
Traf. Mgr., C. Jordan
Refinery located at Bolivar, N. Y.

Allstate Refining Co., Box 270, Tyler, Tex.
Pres., H. H. Coffield
V. P., George P. Mann
Sec. and Treas., J. H. Edwards
Gen. Supt. Ref., George P. Mann
Tankcar S. M., J. H. Edwards
Refinery located at Thrall, Tex.

Alto Refining Co., Corpus Christi, Tex.
Partnership, J. E. Conner and W. L. Goodson
Supt., W. L. Goodson
Refinery located at Clarkwood, Tex.

American Petro-Chemical Co., 309 Basso Bldg., Detroit, Mich.
Pres., Leo E. Jajoie
V. P., Arthur S. Hinsch
Sec. and Treas., Jack Mann
Refinery located at Wayne, Mich.

American Petroleum Co. (of Texas), Petroleum Bldg., Houston, Tex.
Pres., G. O. Irvine
V. P., T. J. Arnold
Sec., G. L. Townsan
Treas., C. T. Carnes
Mgr. of Operations, J. B. Joyce
Supt. of Ref., S. J. Bell
Tankcar and Station S. M., J. M. Cook
Ch. Engr., J. H. Bringhurst
Ch. Chem., H. P. Sellers
Pur. Agt., W. G. Freitag
Traf. Mgr., J. E. Considine
Refinery located at Houston, Tex.

Amseo Refining Co., Box 1607, Corpus Christi, Tex.
Pres., Kent W. Bartlett
V.P.'s, John D. Manley, Ward C. Pearl
Sec., R. J. Scatena
Treas., Forest R. Lowrey
Gen. Mgr., Kent W. Bartlett
Tankcar S. M., J. F. Hayes, American Mineral Spirits Co., Chicago, Ill.
Ch. Chem., G. C. Allison
Pur. Agt., Fred Geiger
Traf. Mgr., M. Monge
Supt., Fred Geiger, Mirando City, Tex.
Refineries located at Mirando City and Corpus Christi, Tex.

Anderson-Prichard Refining Corp., 1000 Ramsey Tower, Oklahoma City, Okla.
Pres., L. H. Prichard
V. P., J. Steve Anderson
Sec. and Treas., P. H. Anderson
Gen. Mgr., L. H. Prichard
Ref. Mgr., George H. Burruss
Mgr. Refined Oil Sales, C. L. Mayhall
Mgr. Ind. Naphthas and Asphalt Sales, C. H. Dresser
Pur. Agt., W. M. Sturges
Traf. Mgr., M. H. Champion
Refinery located at Cyril, Okla.

Arkansas Fuel Oil Co., Slattery Bldg., Shreveport, La.
(Successor by assignment of Louisiana Oil Refining Corp.)
V. P.'s, D. W. Harris, F. R. Coates, J. R. Munce, A. F. Holliday
Sec., T. J. Heard
Treas., B. R. Muirhead
Gen. Mgr., D. W. Harris
Gen. Supt. Ref., R. B. Pierce
Tankcar and Service Sta. S. M., J. A. Welch
Ch. Engr., H. T. Goss
Ch. Chem., A. W. Trusty
Pur. Agt., J. Lucas
Traf. Mgr., E. M. Hinkle
Supt., H. R. Smith, Bossier City, La.
Asst. Supt., George Wilbur, Bossier City, La.
Refinery located at Bossier City, La.

Arro Oil & Refining Co., 605 Montana Bldg., Lewistown, Mont.
Pres., H. H. Schwartz
V. P., Ed L. Allen
Sec., Guy R. Enlow
Treas. and Gen. Mgr., Ed L. Allen
Gen. Supt. Ref., Paul Jones
Tankcar S. M., F. R. Gilmour
Ch. Chem., Paul Cooper
Pur. Agts., Paul Jones, Ed L. Allen
Asst. Supt., Paul Cooper
Refinery located at Lewistown, Mont.

Ashland Oil & Refining Co., Second National Bank Bldg., Ashland, Ky. (Tri-State Refining Co., Affiliated Co.)
Pres., Paul G. Blazer
V. P., William H. Keffer
Sec., E. L. McDonald
Treas., E. W. Seaton
Gen. Mgr., Paul G. Blazer
Gen. Supt. Ref., F. W. Irwin
Tankcar S. M., Everett F. Wells
Station S. M., A. A. Hines
Pur. Agt., Miss M. K. Lovell
Traf. Mgr., P. H. Banks
Refineries located at Catlettsburg, Ky.; Kenova, W. Va.

Atlantic Refining Co., The, 260 South Broad St., Philadelphia, Pa.
Chm. Bd., J. W. Van Dyke
Pres., W. M. Irish
V. P.'s, W. D. Anderson, E. J. Henry, E. R. Cox, W. C. Yeager
V. P. and Sec., W. M. O'Connor
V. P. and Treas., R. H. Colley
Dom. S. M., W. C. Yeager
Export S. M., W. D. Anderson
Ch. Engr., W. Samans
Ch. Chem., Dr. J. H. Boyd, Jr.
Pur. Agt., J. S. Parks
Mgr. of Trans., R. C. Tuttle
Ref. Mgrs., H. M. Nichols, Philadelphia, Pa.; M. J. Welsh, Atreco, Tex.
Asst. Ref. Mgrs., W. F. Stroud, Jr., Philadelphia, Pa.; R. Stewart, Atreco, Tex.
Refineries located at Philadelphia, Franklin and Pittsburgh, Pa.; Atreco, Tex.; Brunswick, Ga.

Atlas Pipe Line Corp., P.O. Box 1607, Shreveport, La.
Pres., E. R. Ratcliff
V.P., B. H. Gray
Sec. and Treas., B. F. Connolly
Gen. Supt. Ref., D. H. Christman
Tankcar S. M., Pleas O. Hardwick
Service Station S. M., W. S. Gray
Ch. Engr., E. A. Meagher
Ch. Chem., I. D. Rushing
Pur. Agt., R. W. Nix
Traf. Mgr., J. S. Satterley
Supt., D. H. Christman, (Jewella), Shreveport, La.
Asst. Supt., C. P. Christman, (Jewella), Shreveport, La.
Refinery located at (Jewella) Shreveport, La.

B

B. & T. Refining Co., Hynes, Calif.
Refinery located at Hynes, Calif.

Bachmann Petroleum Corp., 1841 East Twenty-ninth St., Long Beach, Calif.
Pres., E. O. Bachmann
V. P., D. S. Jeppson

REFINERY OPERATIONS IN NORTH AMERICA SEGREGATED ACCORDING TO PLANT LOCATION

UNITED STATES

State—	No. of plants	Daily crude capacity (bbls.)	Daily cracking capacity (bbls.)	No. of plants operating	Crude capacity operating plants	No. of plants shut-down	Crude capacity plants shut down
Alabama	1	4,000	.....	1	4,000	...	.....
Arkansas	8	40,700	9,000	7	37,200	1	3,500
California	83	878,310	305,100	63	832,960	20	45,350
Colorado	9	7,280	3,100	7	6,200	2	1,080
Delaware	1	3,500	.....	1	3,500	...	.....
Georgia	2	9,000	3,600	1	4,000	1	5,000
Illinois	12	137,300	98,200	12	137,300	...	.....
Indiana	6	205,500	155,200	6	205,500	...	.....
Kansas	26	181,150	99,770	21	173,750	5	7,400
Kentucky	11	29,850	12,400	9	25,850	2	4,000
Louisiana	16	199,150	87,950	13	198,750	3	400
Maryland	3	60,500	46,500	3	60,500	...	.....
Massachusetts	2	41,000	27,800	2	41,000	...	.....
Michigan	19	49,520	17,160	19	49,520	...	.....
Mississippi	1	50	.....	...	.....	1	50
Missouri	2	23,850	19,000	2	23,850	...	.....
Montana	29	27,295	9,800	24	24,355	5	2,940
Nebraska	4	1,175	.....	4	1,175	...	.....
New Jersey	9	256,500	203,600	9	256,500	...	.....
New Mexico	9	7,050	1,400	9	7,050	...	.....
New York	6	56,700	21,000	6	56,700	...	.....
Ohio	16	123,960	67,900	14	123,650	2	310
Oklahoma	42	272,720	99,000	33	246,420	9	26,300
Pennsylvania	43	320,500	191,250	37	300,100	6	20,400
Rhode Island	2	7,000	4,000	2	7,000	...	.....
South Carolina	1	6,500	.....	1	6,500	...	.....
South Dakota	2	360	.....	2	360	...	.....
Tennessee	1	130	.....	1	130	...	.....
Texas	190	1,232,540	624,250	130	1,128,450	60	104,090
Utah	5	10,800	7,600	2	8,500	3	2,300
Virginia	1	2,000	.....	1	2,000	...	.....
West Virginia	6	19,000	20,850	4	10,500	2	8,500
Wyoming	34	51,370	28,300	25	48,390	9	2,980
Total	602	4,266,260	2,163,730	471	4,031,660	131	234,600
CANADA							
Alberta	7	14,000	5,400	6	10,000	1	4,000
British Columbia	3	21,700	6,800	3	21,700	...	.....
Manitoba	3	2,100	.....	3	2,100	...	.....
Northwest Terrs.	1	50	.....	1	50	...	.....
Nova Scotia	1	17,000	8,000	1	17,000	...	.....
Ontario	6	38,600	23,400	6	38,600	...	.....
Quebec	5	41,500	26,000	5	41,500	...	.....
Saskatchewan	11	12,700	4,300	11	12,700	...	.....
Total	37	147,650	73,900	36	143,650	1	4,000
MEXICO							
Total Mexico	6	134,000	12,900	6	134,000	...	.....

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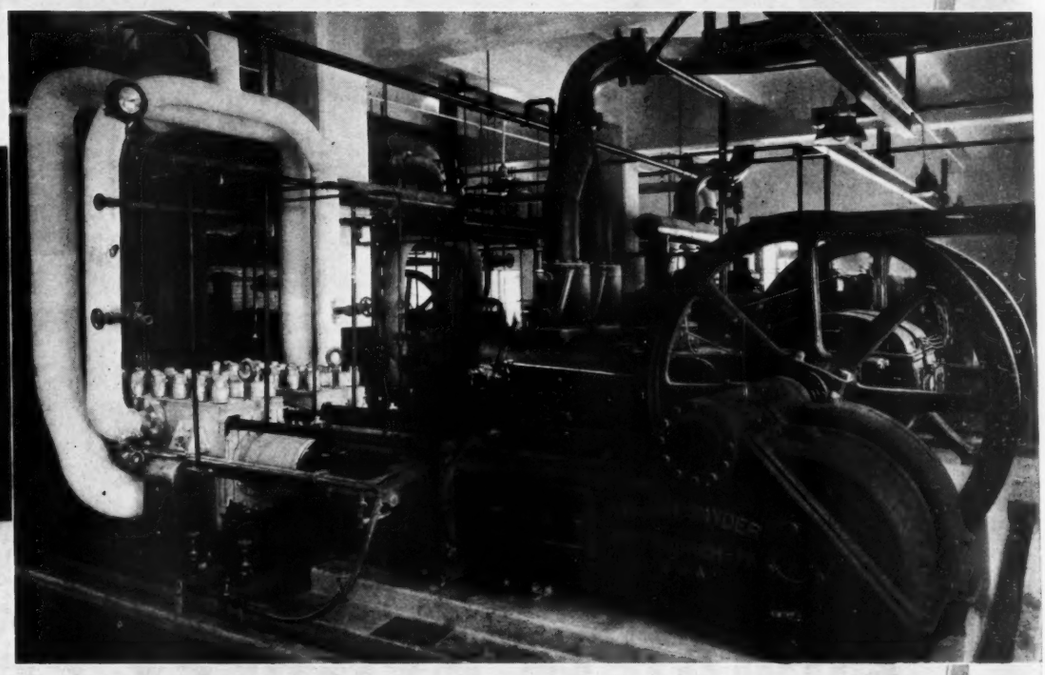

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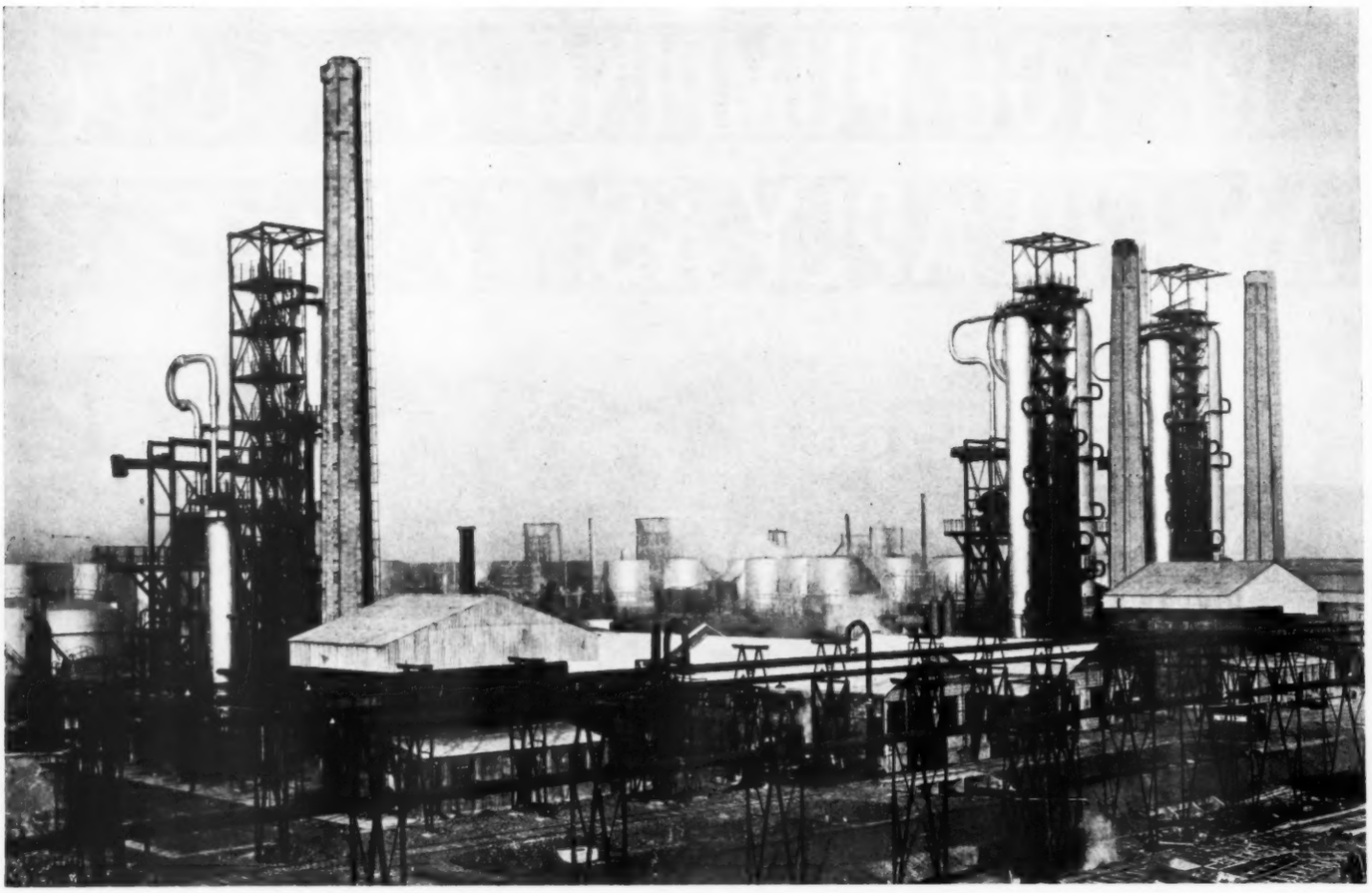

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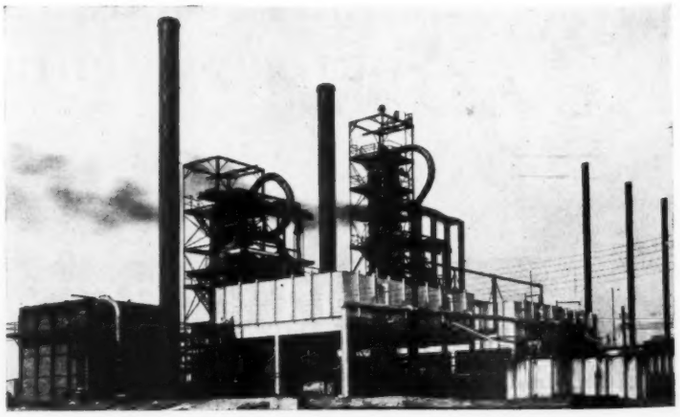
4,000 Barrel per day A.N.C.A.P. Refinery in Montevideo, Uruguay.



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Sec. and Treas., John G. Bachmann
Gen. Supt. Ref., Charles S. Cox
Service Station S. M., A. R. McIntosh
Refinery located at Long Beach, Calif.

Bair, F. M., Oil Co., Box 666, Grand Ledge, Mich.

Pres., F. M. Bair
V.P., H. H. Wilton
Sec. and Treas., Blanche Bair
Gen. Mgr., F. M. Bair
Ch. Chem., L. B. Brown
Supt., Clifford Osmer
Refinery located at Grand Ledge, Mich.

Baird Refining Co., Baird, Tex.

Pres., M. G. Blalock
V. P., J. R. Parten
Sec., R. P. Hargis
Treas., J. R. Pope
Gen. Mgr., Sylvester Dayson
Tankcar S. M., Sylvester Dayson
Station S. M., E. L. Woodley
Pur Agt., J. E. Bullock
Supt., J. B. Misenheimer
Refinery located at Baird, Tex.

Barber Co., Inc., The, 1600 Arch St., Philadelphia, Pa.

Pres., J. E. Auten
V. P.'s, C. W. Bayliss, Frank Seamans
Sec., E. R. Riter
Treas., F. J. Robertson
Prod. Mgr., J. H. Weller
Gen. Supt. Ref., Joseph Slutzker
Tankcar S. M., H. C. Hottel
Ch. Engr., Charles T. McGrady, Maurer, N. J.
Dir. Tech. Bur., J. S. Miller, Maurer, N. J.
Pur. Agt., R. A. Brady
Supt., H. J. Fleischer
Refinery located at Maurer, N. J.

Barnsdall Refining Corp., Petroleum Bldg., Tulsa, Okla.

Pres., E. B. Reeser
V. P.'s, F. E. Holsten, G. F. Racette
Sec. and Treas., C. E. Votrian
Gen. Mgr., F. E. Holsten
Gen. Supt. of Ref., F. E. Holsten
Tankcar and Station S. M., G. F. Racette
Ch. Chem., E. R. Wiles
Pur. Agt., O. E. McClatchey
Traf. Mgr., R. E. Stewart
Supts., V. R. Oakley, Barnsdall, Okla.; F. S. Horne, Wichita, Kans.; G. T. Granger, Okmulgee, Okla.
Asst. Supt., J. V. Brazier, Barnsdall, Okla.
Refineries located at Barnsdall, Okla.; Okmulgee, Okla.; Wichita, Kans.

Basin Refining Co., Box 96, Aztec, N. Mex.

Owner, D. J. Lingenfelter
Refinery located at Aztec, N. Mex.

Bayou State Oil Corp., 726 Ardis Bldg., Shreveport, La.

Pres., P. M. Brown
V. P., S. M. Cook
Sec. and Treas., Frank M. Cook
Gen. Mgr., P. M. Brown
Gen. Supt. Ref., T. N. Reed
Tankcar S. M., W. T. Leeper
Ch. Engr., T. N. Reed
Ch. Chem., H. J. Sheard
Pur. Agt., F. D. Coons
Traf. Mgr., F. D. Coons
Refinery located at Hosston, La.

Bay Petroleum Corp., Denver, Colo.

Pres., M. H. Robineau
Refineries located at Denver, Colo., and Cheyenne, Wyo.

Beacon Oil & Refining Co., Henderson, Tex.

Pres., T. P. Cannon
V. P., Mrs. Alice M. Roberts
Sec., T. A. Garnett
Treas. and Gen Mgr., T. P. Cannon
Gen. Supt. Ref., L. H. Barbee
Tankcar S. M., Mrs. E. H. Graves
Station S. M., Bob McWilliams
Refinery located at Henderson, Tex.

Bell Oil & Gas Co., P. O. Box 2007, Tulsa, Okla.

Pres., S. L. Lubell
V. P.'s, Albert Finston, M. L. Freese, I. A. Anson
Sec. and Treas., B. I. Lubell
Gen. Mgr., Albert Finston
Gen. Supt. Ref., Rex Young
Tankcar S. M., L. H. Deatherage
Pur. Agt., J. H. Naron
Traf. Mgr., C. E. Caddieux
Supts., J. Cromwell, Gladewater, Tex.; Rex Young, Grandfield, Okla.
Refineries located at Grandfield, Okla., and Gladewater, Tex.

Benco Refining Co., Three Rivers, Tex.

Refinery located at Three Rivers, Tex.

Bennett Refining Co., Esperson Bldg., Houston, Tex.

Pres., Frank W. Bennett
V.P., Clyde V. Shuford
Refineries located at Houston, Tex.

Berry Asphalt Co., 1472 W. Seventy-sixth St., Chicago, Ill.

Pres., B. H. Roberts
V. P., H. B. Pullar
Sec. and Treas., A. H. Anderson
Gen. Mgr., H. B. Pullar
Gen. Supt. Ref., A. T. Van Pelt
Tankcar S. M., S. H. Giesy
Ch. Engr., J. W. Smith
Ch. Chem., F. R. Grant
Pur. Agts., J. W. Smith, Chicago, Ill.; J. W. Savage, Waterloo, Ark.
Asst. Supt., R. N. Smith, Waterloo, Ark.
Refinery located at Waterloo, Ark.

Berry, James B., Sons, Co., Inc., Quaker State Bldg., Oil City, Pa.

Pres., James D. Berry
V.P.'s, S. Messer, Frank Berry, James R. Sloane
Sec., W. R. Reitz
Treas., Charles D. Berry
Gen. Supt. Ref., Harry Shoemaker
Tankcar S.M., Frank Berry
Ch. Chem., Russell Buckham
Pur. Agt., Lee R. Forker
Traf. Mgr., George W. Ebert
Asst. Supt., Paul Biery
Refinery located at Oil City, Pa.

Berthoud Refinery, P.O. Box 336, Berthoud, Colo.

Owners, W. J. Cole and D. J. Lingenfelter
Refinery located at Berthoud, Colo.

Big West Oil Co. of Montana, 617 Hutton Bldg., Spokane, Wash.

Pres., L. R. Hawley
V.P.'s, Charles P. Lund, T. D. Fobes
Sec. and Treas., John E. Orr
Asst. Sec. and Treas., M. D. Prince
Gen. Mgr., L. R. Hawley
Gen. Supt. Ref., George Engle, Kevin, Mont.
Dir. of Sales, R. I. Kerr
Tankcar and Service Station S. M., Amed Soderstrom
Ch. Chem., Dan Mullady
Pur. Agt., George Engle
Traf. Mgr., George Engle
Asst. Supt., L. J. Williams, Kevin, Mont.
Refinery located at Kevin, Mont.

Black Gold Refining Co., Commerce Bldg., Oklahoma City, Okla.

Pres., A. M. Edmiston
V.P., M. Kleeden
Sec., C. W. Scott
Treas., C. H. Marshall
Gen. Mgr., A. M. Edmiston
Gen. Supt. Ref., E. C. Livingston
Tankcar S. M., C. W. Scott
Service Station S. M., C. J. Hunter
Ch. Chem., H. P. Fishburn
Asst. Supt., F. Ballon
Refinery located at Oklahoma City, Okla.

Bradford Oil Refining Co., Bradford, Pa.

Pres., E. R. Lederer
V. P., F. D. Korner
Sec. and Treas., H. G. Barcroft
Tankcar and Bulk Station S. M., J. G. Fleishman
Plant Mgr., C. A. Barrere
Pur. Agt., H. B. Newbern
Traf. Mgr., W. F. Jewell
Refinery located at Bradford, Pa.

Bradford Penn Refining Corp., Brown Ave., Clarendon, Pa.

Pres., Forest D. Dorn
V. P., A. D. David
Sec., Frank G. Miller
Treas., R. J. Brennan
Gen. Mgr., A. D. David
Gen. Supt., F. L. Herle
Tankcar S. M., J. F. Baldwin
Ch. Chem., W. A. Johnston
Pur. Agt., S. L. Myer
Traf. Mgr., S. L. Myer
Refinery located at Clarendon, Pa.

Bright Stock Co., The, Armstrong Bldg., El Dorado, Ark.

Alfred Macmillan, sole owner
Sec. and Treas., D. M. Yocum
Gen. Mgr., Alfred Macmillan
Gen. Supt. Ref., W. H. Powell
Tankcar S. M., S. M. Batterson
Ch. Engr., Jack Lee
Ch. Chem., W. C. Nolan
Pur. Agt., E. B. Terry
Traf. Mgr., E. B. Terry
Asst. Supt., S. J. Manor
Refinery located at El Dorado, Ark.

Bush, R. R., Oil Co., 2790 Cherry Ave., Long Beach, Calif.

Pres., R. R. Bush
V. P., W. H. Morgan
Sec. and Treas., Neil Ensch
Gen. Mgr., W. H. Morgan
Gen. Supt. Ref., W. E. Snowden
Ch. Chem., P. H. Bessor
Pur. Agt., G. N. Crowther
Supt., Ray Rubottom
Refinery located at Long Beach, Calif.

C

C. & H. Refinery, Lusk, Wyo.

Partnership, Roy Chamberlain and James Hoblit
Refinery located at Lusk, Wyo.

Calumet Refining Co., 4323 S. Western Blvd., Chicago, Ill.

Pres., P. B. Flynn
V. P., T. A. Telfer
Sec. and Treas., R. S. Watt
Gen. Mgr., T. A. Telfer
Gen. Supt. Ref., Carl Harris, Burnham, Ill.
Tankcar S. M., A. J. Smith
Ch. Chem., M. B. Jester
Traf. Mgr., George Rung
Refinery located at Burnham, Ill.

Caminol Co., Ltd., The, 112 West Ninth St., Los Angeles, Calif.

Pres., C. B. Colby
V. P., R. E. Hines
Sec., Thomas H. Lipps
Treas., C. B. Colby
Gen. Mgr., R. E. Hines
Gen. Supt. Ref., R. C. Calvin
Tankcar S. M., J. M. MacElwain
Service Station S. M., M. Clifford Hancock
Ch. Engr., R. C. Calvin
Ch. Chem., Sid Garrett
Pur. Agt., Robert MaCament
Prod. Supt., William Wells
Supts., Thomas Conlson, Hanford, Calif.; Dave Lewis, Santa Fe Springs, Calif.; Martin Mueller, Venice, Calif.
Refineries located at Santa Fe Springs, Hanford, and Venice, Calif.

Canfield Oil Co., The, 3216 East 55th St., Cleveland, Ohio

Pres., Charles McLean
V. P.'s, J. A. Jackson, H. M. Carruth
Sec., John R. Nelson
Asst. Sec., F. J. Van Bergen
Treas., A. L. Bailey
Gen. Supt. Ref., R. W. Helm, Coraopolis, Pa.; S. L. Milliff, Cleveland, Ohio
Tankcar S. M., J. R. Nelson
Service Stattion S. M., A. C. Ellinger
Ch. Engr., L. W. Hodous
Ch. Chem., L. W. Hodous
Pur. Agt., M. C. Dippel
Traf. Mgr., J. T. Mullaney
Refineries located at Coraopolis, Pa.; Cleveland, Ohio

Capitol Crude Oil Co. of Los Angeles, 1020 Subway Terminal Bldg., Los Angeles, Calif.

Pres., E. P. Clark
Refinery located at Santa Paula, Calif.

Carbide & Carbon Chemicals Corp., 30 E. Forty-second St., New York, N. Y.

Pres., J. A. Rafferty
V.P.'s, G. O. Curme, Jr., J. G. Davidson, J. W. McLaughlin, H. E. Thompson, R. W. White
Sec., A. C. Cornell
Treas., C. T. Ayres
Works Mgr., G. B. Landes
Gen. Supt. Ref., C. S. Heath, South Charleston, W. Va.
Sales Mgr., W. F. Reich, Jr.
Refinery located at South Charleston, W. Va.

Carpenter, Terry, Box 170, Scotts Bluff, Neb.

Pres., Terry Carpenter
Gen. Mgr., Mrs. George Hillerege
Gen. Supt. Ref., Mr. Glasby
Ch. Engr., Clifford Boyer
Ch. Chem., H. E. Taylor
Refinery located at Scottsbluff, Neb.

Carson, M. D., Refining Co., Brady, Tex.

Owner, M. D. Carson
Refinery located at Brady, Tex.

Cascade Refining Co., Kilgore, Tex.

Gen. Mgr., Julian Potter
Gen. Supt. Ref., J. O. Johnston
Refinery located at Kilgore, Tex.

Central Oil Co., Glasgow, Ky.

Pres., R. B. Tyler
Sec. and Treas., Sewell C. Harlin
Refinery located at Glasgow, Ky.

Chalmette Petroleum Corp., 1904 American Bank Bldg., New Orleans, La.

Pres., B. C. McClellan
Exec. V. P., D. B. Williams
V. P.'s, Charles Leftwich, C. D'Antoni
Sec. and Treas., R. P. Batson
Asst. Sec. and Treas., L. E. Vivien
Gen. Supt. Ref., J. C. Senter
Tankcar S. M., H. G. Williams
Ch. Engr., J. C. Senter
Ch. Chem., L. P. McCurnin
Pur. Agt., V. G., McPherson
Traf. Mgr., J. E. Loper
Asst. Supt., H. H. Long, Chalmette, La.
Refinery located at Chalmette, La.

Champlin Refining Co., Enid, Okla.

Pres., H. H. Champlin
V. P., Joe N. Champlin
Sec. and Treas., D. W. Cotton
Tankcar S. M., L. A. Snyder
Station S. M., A. H. Holland
Gen. Supt. Ref., E. J. Slater
Ch. Engr., R. L. Clifton
Pur. Agt., L. E. Noble
Traf. Mgr., J. L. Morgan
Refinery located at Enid, Okla.

Chase Refining Co., The, Chase, Kans.

Pres., Ben Taxman
V. P., Louis Rose
Sec., B. T. Hurwitz
Treas., Hymie Milder
Gen. Mgr., Ben Taxman
Gen. Supt. Ref., Charles Linnen
Tankcar S. M., Ben Taxman
Ch. Chem., Vernon Benst
Pur. Agt., K. C. Ayer
Refinery located at Chase, Kans.

Chief Refining, Inc., Gladewater, Tex.

Pres., H. C. Haberle
Gen. Supt., B. J. Marean
Sales Mgr., N. R. Cooper
Ch. Chem., J. R. Hurmans
Refinery located at Gladewater, Tex.

Barrett

PIPE LINE ENAMELS

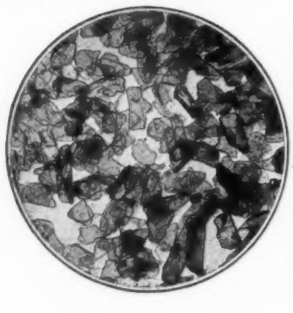
FIELD SERVICE

The Barrett Company maintains a Pipe Line Service Department to assist engineers in all coating problems, and also has available Field Service men whose assistance is offered where Barrett's protective coatings are used. Inquiries are invited.

MAXIMUM WATERPROOFING

The waterproofing agent in Barrett Pipe Line Enamels is coal-tar pitch—the most stable bituminous material known. Combined with it in correct proportions is a special flake-type reinforcement. Together these elements not only provide maximum waterproofing and protection from corrosion, but also exceptional resistance to damage from soil stresses. In addition, these enamels possess lasting dielectric qualities and high resistance to alkalis and soil acids.

THE BARRETT COMPANY
40 RECTOR STREET NEW YORK, N. Y.



Reproduction of the micrograph at the left shows the interlocking of the flakes of the internal reinforcement used by Barrett. By laminating with the waterproofing agent, they give Barrett Pipe Line Enamels unusual toughness and resistance to soil stresses.

For pipe of larger diameter, The Barrett Company will furnish equipment required to revolve pipe and spread enamel.

Cities Service Oil Co., 60 Wall Tower, New York, N. Y.

Pres., Frank R. Coates
V.P.'s, Harry D. Frueauff, Charles E. Foster, Christopher Story, H. E. Brandli, John S. Cordell, T. W. Tutwiler
Sec., A. R. Thorson
Treas., W. W. Martin
Gen. Supts. Ref., J. W. Griswold, L. M Bound, Boston, Mass.
Tankcar S. Mgrs., A. H. Irelan, J. A. Kelley, Boston, Mass.
Service Station S. Mgrs., G. W. Hawkins, J. A. Kelley, Boston, Mass.
Ch. Chems., W. N. Wescott, A. H. Alden, Boston, Mass.
Pur. Agts., E. D. Erney, C. L. Boyle, Boston, Mass.
Traf. Mgr., W. A. Hamel
Supts., C. E. Kinder, Titusville, Pa.; A. P. Frame, Petty Island, N. J.; D. P. Sturges, E. Braintree, Mass.
Asst. Supts., A. F. Anderson, Titusville, Pa.; W. H. Price, Petty Island, N. J.
Refineries located at E. Braintree, Mass.; Petty Island, N. J.; Titusville, Pa.

Citizens Oil & Refining Corp., Walker Bldg., Luling, Tex.

Pres., Abner Ussery
V. P., O. R. Corcoran
Sec. and Treas., H. J. Mayton
Gen. Mgr., R. E. Goode
Gen. Supt. Ref., R. E. Goode
Tankcar S. M., H. J. Mayton
Pur. Agt., H. J. Mayton
Refinery located at Luling, Tex.

Clay Refining Co., Arp, Tex.

Pres., Dick Duncan
V. P., C. W. Curtis
Sales Mgr., R. T. Bowen
Refinery located at Arp, Tex.

Coastal Refineries, Inc., P.O. Box 1039, Taylor, Tex.

Pres., G. L. Rowsey
V. P., Ben H. Harrison
Sec., Harris A. Melasky
Treas., Ben H. Harrison
Gen. Mgr., G. L. Rowsey
Gen. Supt. Ref., G. L. Rowsey
Ch. Chem., Donald Porter
Pur. Agt., Ben H. Harrison
Traf. Mgr., Ben H. Harrison
Supt., J. L. Sewell, Port Isabel, Tex.
Refinery located at Port Isabel, Tex.

Coleman Refining Corp., Coleman, Tex.

Owners, Roy McGlothlin and R. Jones
Refinery located at Coleman, Tex.

Colonial Beacon Oil Co., Inc., 278 Stuart St., Boston, Mass.

Pres., A. Clarke Bedford
V. P., E. N. Wrightington
Sec. and Treas., E. N. Wrightington
Mgr. of Ref., P. C. Shea
Gen. Supt. Ref., W. Naden
Tankcar S. M., J. C. Richdale
Ch. Engr., H. L. Bolton
Ch. Chem., J. D. Lawler
Pur. Agt., G. E. Clark
Traf. Mgr., J. H. Gies
Supt., W. Naden, Everett, Mass.
Refinery located at Everett, Mass.

Col-Tex Refining Co., 1000 Ramsey Tower, Oklahoma City, Okla.

Pres., L. H. Prichard
V. P., J. Steve Anderson
Sec. and Treas., P. H. Anderson
Gen. Mgr. L. H. Prichard
Ref. Mgr., George H. Burruss
Mgr. Refined Oil Sales, C. L. Mayhall
Mgr. Ind. Naphthas and Asphalt Sales, C. H. Dresser
Pur. Agt., W. M. Sturges
Traf. Mgr., M. H. Champion
Supt., E. H. Gunn
Refinery located at Colorado, Tex.

Concho Refining Co., Box 79, San Angelo, Tex.

Pres., R. D. Lavery
Treas., C. B. Mitchell
Supt., R. D. Lavery
Refinery located at San Angelo, Tex.

Conewango Refining Co., 746-760 Market St., Warren, Pa.

Pres., Harry R. Lewis
Sec. and Treas., T. M. Demarest
Tankcar S. M., K. M. Lyons
Ch. Engr., A. Gohn
Ch. Chem., C. W. McConnell
Pur. Agt., Paul Broderick
Traf. Mgr., M. E. Finley
Supt., W. L. Gettings
Asst. Supt., K. Brogan
Refinery located at Warren, Pa.

Consumers Refining Co., Conrad, Mont.

Pres., Perry L. Withers
V. P., E. H. Withers
Sec. and Treas., D. L. Simon
Refinery located at Collins, Mont.

Continental Oil Co., Ponca City, Okla.

Pres., D. J. Moran
V. P.'s, W. W. Bruce, W. H. Ferguson, Walter Miller, R. E. Collom, Harry J. Kennedy
Sec., James J. Cosgrove
Treas., G. F. Smith
V. P. in Chg. Mfg., Walter Miller
Mfg. Mgr., Harold G. Osborn
Tankcar and Sta. S. M., H. J. Kennedy
Ch. Engr., M. E. Clawson
Ch. Chem., B. H. Lincoln
Pur. Agt., W. H. O'Connor
Traf. Mgr., P. H. Kuhns
Supts., Fred G. Fellows, Ponca City, Okla.; J. W. Brown, Baltimore, Md.; D. H. Hyler, Wichita Falls, Tex.; C. R. Tillman, Glenrock, Wyo.; C. V. Coulson, Farmington, N. Mex.; Charles Morgan, Artesia, N. Mex.; J. E. Fenex, Denver, Colo.; H. H. Kinnaird, Albuquerque, N. Mex.; L. L. Smith, Lewistown, Mont.
Asst. Supts., J. O. Thoen, Ponca City, Okla.; W. M. Cocke, Baltimore, Md.; Charles Ramsey, Wichita Falls, Tex.; R. H. Main, Glenrock, Wyo.
Refineries located at Ponca City, Okla.; Baltimore, Md.; Wichita Falls, Tex.; Glenrock, Wyo.; Farmington, N. Mex.; Artesia, N. Mex.; Denver, Colo.; Albuquerque, N. Mex.; Lewistown, Mont.

Continental Refining Co., Box 175, Oil City, Pa.

Pres., T. A. Anderton
V.P., M. DeArman
Sec., Sam DeArman
Treas., J. W. Anderton
Gen. Supt. Ref., I. L. Klein
Tankcar and Service Station S. M., C. H. Thomas
Ch. Engr., J. Vogan
Ch. Chem., Eugene Hanna
Pur. Agt., C. H. Thomas
Traf. Mgr., D. C. Hasson
Refinery located at Oil City, Pa.

Corpus Christi Refining Co., P.O. Box 1039, Taylor, Tex.

Pres., G. L. Rowsey
V. P., J. F. Whitehurst
Sec. and Treas., Ben H. Harrison
Gen. Mgr., G. L. Rowsey
Gen. Supt. Ref., G. L. Rowsey
Tankcar S. M., Ben H. Harrison
Pur. Agt., Ben H. Harrison
Traf. Mgr., Ben H. Harrison
Supt., J. F. Whitehurst
Asst. Supt., G. R. Whitener
Refinery located at Corpus Christi, Tex.

Cosden Oil Corp., 1700 Electric Bldg., Fort Worth, Tex.

Temporary Trustee, W. D. Richardson
Pres., J. S. Cosden
V. P.'s, W. D. Richardson, A. G. Reed
Asst. Sec., W. D. Richardson
Asst. Treas., A. G. Reed
Gen. Mgr., W. D. Richardson
Gen. Supt. Ref., E. W. Potter
Tankcar and Station S. M., W. D. Richardson
Ch. Engr., T. L. Lumly
Ch. Chem., E. W. Richardson
Pur. Agt., E. E. Brodgon
Traf. Mgr., D. L. Orme
Asst. Supt., G. L. Lebleu, Big Spring, Tex.
Refinery located at Big Spring, Tex.

Crook County Refinery, Sundance, Wyo.

Allen Snyder and Andy Policky (Copartnership)
Refinery located at Sundance, Wyo.

Cross, Henry H., Co., 122 So. Michigan Ave., Chicago, Ill.

Pres., H. H. Cross
V. P., Geo. F. Fox
Traf. Mgr., P. J. O'Neal
Supts., George Hovell, Smackover, Ark., D. L. Crandall, Colmar, Ill., J. McAndrew, Dupo, Ill., Geo. Knupp, Joliet, Ill.
Refineries located at Smackover, Ark., Colmar, Ill., Dupo, Ill., Joliet, Ill.

Crown Central Petroleum Corp., P.O. Box 1759, Houston, Tex.

Pres., Henry A. Rosenberg, 803 American Bldg., Baltimore, Md.
V. P., H. S. Lane
Sec., James T-B. Bowles, Baltimore, Md.
Asst. Sec., S. K. Lawhon
Treas., S. K. Waters
Ref. Mgr., K. W. Shimeall
Supt. Ref., R. F. Myers
Gen. S. M., Jesse Stickel, 420 Lexington Ave., New York City
Mgr. Crude Pur., Walter Rawlins
Pur. Agt., David Hutchinson
Traf. Mgr., F. C. Clark
Refinery located at Houston, Tex.

Crown Oil Co., Fort Worth, Tex.

Owner, W. H. Harrison
Refinery located at Fort Worth, Tex.

Crystal Oil Works Co., Rouseville, Pa.

Gen. Mgr., J. A. Fawcett
Gen. Supt. Ref., W. B. Graham
Traf. Mgr., J. W. Fawcett
Refinery located at Rouseville, Pa.

Crystal Refining Co. of Carson City, Inc., Carson City, Mich.

Pres., Delbert Fortney
V. P.'s, G. Fred Pratt, Everett G. Guy, Jackson, G. Fleckenstein
Sec. and Treas., M. A. Hagerman
Asst. Treas., Delbert Fortney
Gen. Mgr., Everett G. Guy
Gen. Supt. Ref., Everett G. Guy
Tankcar and Service Station S. M., R. C. Wilbur
Ch. Engr., C. B. Johnson
Ch. Chem., Guy Gossett
Traf. Mfg., R. C. Wilbur
Refinery located at Carson City, Mich.

Cusco Oil & Refining Co., The, 209 Brown Bldg., Wichita, Kans.

Pres., I. W. Siegel
Sec. and Treas., Frank H. Unruh
Gen. Mgr., Harry H. Becker
Gen. Supt. Ref., Jesse F. Hughes
Refinery located at Chase, Kans.

Cushing Refining & Gasoline Co., Cushing, Okla.

Pres., E. C. Mullendore
V. P., Rex H. Winget
Sec., M. E. James
Treas., R. C. Jones
Gen. Mgr., Rex H. Winget
Gen. Supt. Ref., J. H. Hutchinson
Tankcar S. M., E. O. Derrick
Ch. Chem., T. B. Randall
Pur. Agt., Rex H. Winget
Traf. Mgr., M. E. James
Refineries located at Cushing, Okla., Blackwell, Okla.

Cut Bank Refining Co., Cut Bank, Mont.

Pres., Kenneth H. Davis
V. P., R. C. Tarrant
Sec. and Treas., J. A. Strack
Gen. Mgr., Kenneth H. Davis
Gen. Supt. Ref., H. A. Lynn
Pur. Agt., Kenneth H. Davis
Refinery located at Cut Bank, Mont.

D

Danciger Oil & Refineries, Inc., Hunt Bldg., Tulsa, Okla.

Pres., Dan Danciger
V. P.'s, Joseph Danciger, Jack Danciger, A. Danciger
Sec., J. E. Vaeth
Treas., Joseph Danciger
Tankcar S. M., Leo R. Brammer
Pur. Agt., Jay Hausam
Traf. Mgr., R. R. Maines
Supts., F. E. Shryock, Pampa, Tex.; M. R. Ryan, Longview, Tex.
Asst. Supts., L. E. Keck, Pampa, Tex.; Ben Ferris, Longview, Tex.
Refineries located at Pampa, Tex., and Longview, Tex.

Danube Oil Corp., Amarillo Bldg., Amarillo, Tex.

Pres., R. Underwood
V.P., C. M. Humphrys
Sec. and Treas., George Kensey
Gen. Mgr., R. Underwood
Gen. Supt. Ref., F. B. Marshall
Tankcar and Service Station S. M., F. J. Harper
Ch. Chem., Olin McGlothlin
Pur. Agt., F. B. Marshall
Refinery located at Borger, Tex.

Daugherty Refinery, Division of L. Sonneborn Sons, Inc., Petrolia, Pa.

Pres., Dr. F. Sonneborn
V. P.'s, S. B. Sonneborn, J. F. Roten
Sec., R. G. Sonneborn
Treas., Max Pick
Gen. Mgr., T. M. Murphy
Gen. Supt. of Ref., C. E. McGinnis
Tankcar S. M., A. L. Larkin
Ch. Engr., D. A. Schoerke
Ch. Chem., Dr. F. W. Breth
Traf. Mgr., L. L. Gamble
Refinery located at Petrolia, Pa.

Davis Refinery, Inc., 1005 Nixon Bldg., Corpus Christi, Tex.

Pres., J. B. Davis
V. P., G. C. White
Sec. and Treas., M. H. White
Gen. Mgr., J. B. Davis
Pur. Agt., J. B. Davis
Supt., J. P. McFarland
Refinery located at Corpus Christi, Tex.

Deep Rock Oil Corp., Atlas Life Bldg., Tulsa, Okla.

Trustee, H. N. Greis
Ref. Mgr., W. E. Moody
Supt., George Waltershausen, Cushing, Okla.
Tankcar and Station S. M., W. J. Carthaus, Chicago, Ill.
Ch. Engr., R. G. Davis, Cushing, Okla.
Ch. Chem., B. Frichot, Cushing, Okla.
Pur. Agt., R. G. Martin
Traf. Mgr., B. J. Burchett, Chicago, Ill.
Refinery located at Cushing, Okla.

Deep Sand Oil Co., Box 435, Marshall, Tex.

Pres., J. S. Johnson
V.P., W. G. Banks
Sec. and Treas., R. M. Nichols
Gen. Supt. Ref., J. S. Johnson
Supt., R. B. Gray, Reeds, Tex.
Refinery located at Reeds, Tex.

Deloraine Refining Co., Oilmont, Mont.

Pres., Henry Vander Pas, Ferdig, Mont.
V. P., J. M. George, Deloraine, Manitoba
Sec., Treas., and Gen. Mgr., Everett A. Rice
Refinery located at Oilmont, Mont.

Denver Refining Synd., 1225 Twelfth St., Denver, Colo.

Partnership of J. D. Cook, Luke E. Smith and R. B. Sims
Asst. Supt., C. D. Cook
Refinery located near Denver, Colo.

Derby Oil Co., The, 352 N. Broadway, Wichita, Kans.
Ch. of Bd., A. L. Derby
Pres., Berkeley Williams
V.P.'s, E. C. Moriarty, F. W. McCurry
Sec., E. Wasser
Treas., E. C. Claiborn
Gen. Supt. Ref., F. W. McCurry
Tankcar S. M., C. A. Keller
Service Station S. M., C. A. Clarke
Ch. Chem., Dr. Messmore
Pur. Agt., R. E. Cowen
Traf. Mgr., H. G. Watts
Supt., George Webber
Asst. Sup., Ray Vermillion
Refinery located at Wichita, Kans.

Diamond Oil Co., 404 Beneficial Life Bldg., Salt Lake City, Utah
Pres., John Shewell
Sec., Anna Hill
Gen. Mgr., Harold Shewell
Refinery located at Virgin, Utah

Dickey Refining Co., The, Ellis-Singleton Bldg., Wichita, Kans.
Pres., George P. Dickey
V. P., Ruby Dickey
Sec. and Treas., H. Dungan
Gen. Supt. Ref., Carl Orrison
Ch. Chem., Earl Martin
Refinery located at McPherson, Kans.

Dunlap Refining, Cat Creek, Mont.
Owner, W. F. Dunlap
Refinery located at Cat Creek, Mont.

E

Eagle Oil & Refining Co., 3328 Elm Ave., Los Angeles, Calif.
Pres. and Gen. Mgr., E. A. Edminston
Refinery located at Santa Fe Springs, Calif.

Eason Oil Co., Bass Bldg., Enid, Okla.
Pres. and Gen. Mgr., T. T. Eason
V. P., L. D. Hinman
Sec. and Treas., T. W. Eason
Gen. Supt. Ref., P. G. Maranville
Tankcar S. M., R. H. Rowland
Station S. M., J. D. Montgomery
Ch. Chem., G. B. Lyon
Pur. Agt., A. C. Hatton
Traf. Mgr., H. A. Meyer
Refinery located at Enid, Okla.

Eastern States Petroleum Co., Inc., 630 Fifth Ave., New York, N. Y.
Pres., R. B. Kahle
V.P.'s, D. W. Armstrong, L. J. Walsh, J. F. McCarthy
Sec. and Treas., D. W. Armstrong
Gen. Mgr., B. F. Fallon, Houston, Tex.
Gen. Supt. Ref., Roger Traweek
Tankcar S. M., B. F. Fallon, Houston, Tex.
Ch. Engr., Frank B. Makepeace, Jr.
Pur. Agt., Frank B. Makepeace, Jr.
Traf. Mgr., John Painter
Supt., John Boyles, Houston, Tex.
Refinery located at Houston, Tex.

East Jackson Refining Co., P.O. Box 119, Jackson, Miss.
Pres., J. D. Williams
V.P., R. L. Hardin
Sec. and Treas., Bessie Thurmond
Refinery located at Jackson, Miss.

East Texas Refining Co., 1405 Tower Petroleum Bldg., Dallas, Tex.
Pres., F. W. Burford
V. P., J. J. Thomas
Sec., John R. Scott
Treas., E. V. Campbell
Gen. Mgr., F. W. Burford
Gen. Supt. Ref., J. J. Thomas
Tankcar S. M., Ralph E. Bishop
Service Station S. M., J. B. Cashell
Pur. Agt., W. M. Bisett
Traf. Mgr., A. L. Heine
Asst. Supt., H. H. Knock, Longview, Tex.
Refinery located at Longview, Tex.

Edington Oil & Refining Co., Ltd., 2800 Cherry Ave., Long Beach, Calif.
Pres., C. B. Edington, Beverly Hills, Calif.
V. P., C. B. Edington, Jr.
Sec., A. B. Edington, Los Angeles, Calif.
Gen. Mgr., C. B. Edington
Gen. Supt. Ref., L. A. Foulger
Tankcar S. M., C. M. Edington
Ch. Chem., Frank Wohlgarmeth
Refinery located at Signal Hill, Calif.

Egaso Operating Co., Box 428, Osage, Wyo.
Pres., Albert E. May
V.P., E. E. Wakeman
Sec., A. F. Lesley
Treas., Harry A. May
Gen. Mgr., A. F. Lesley
Refinery leased and operated by Wyoming Gas & Oil Co.

El Dorado Refining Co., The El Dorado National Bank Bldg., El Dorado, Kans.
Pres., Charles G. Yankey
V. P. and Treas., Robert H. Bradford
Sec. and Gen. Mgr., T. A. Helling
Gen. Supt. of Ref., G. C. Anderson
Tankcar S. M., C. W. Rice
Ch. Chem., C. M. Boone
Pur. Agt., O. G. Jackson
Traf. Mgr., R. E. Fisher
Asst. Supt., H. J. Datin
Refinery located at Eldorado, Kans.

Elk Horn Gas Refinery, Osage, Wyo.
Owners, J. J. Eaton and Joseph F. Dornacher
Refinery located at Osage, Wyo.

Elk Refining Co., Box 1824, Charleston, W. Va.
Pres., H. A. Logan
V. P. and Treas., F. G. Bannerot
Sec., Fred G. Bannerot, Jr.
Gen. Mgr., R. D. Lowe
Gen. Supt., Robert Burr
Tankcar S. M., C. V. Harner
Station S. M., J. W. Wright
Ch. Engr., C. E. Kirk
Ch. Chem., F. A. Nicholson
Pur. Agt., E. B. Hamilton
Traf. Mgr., L. K. Forthman
Asst. Supt., C. J. Hesch, Falling Rock, W. Va.
Refinery located at Falling Rock, W. Va.

Elm Oil Co., Ltd., 3328 Elm Ave., Long Beach, Calif.
Pres., Fred Striner
Sec., Treas., and Gen. Mgr., G. Kindseth
Gen. Supt. Ref., Fred Striner
Refinery located at Long Beach, Calif.

El Tejon Refining Co., Inc., Box 993, Bakersfield, Calif.
Refinery located at Mountain View, Calif.

Empire Oil and Refining Co., Masonic-Empire Bldg., Bartlesville, Okla.
Pres., F. R. Coates, 60 Wall St., New York, N. Y.
V. P.'s, H. R. Straight, A. W. Ambrose, C. E. Murray, H. D. Fruehauff, 60 Wall St., New York, N. Y.
Sec., C. E. Murray
Gen. Mgr., H. W. Camp, Tulsa, Okla.
Gen. Supt. Ref., L. D. Mann, Tulsa, Okla.
Tankcar S. M., O. J. Tuttle, Tulsa, Okla.
Service Station S. M., C. A. Willis, Chicago, Ill.
Ch. Chem. W. W. Schuemann, Tulsa,
Ch. Engr., Clay Briggs
Okla.
Pur. Agt., G. E. Goddard
Traf. Mgr., A. C. Holmes, Tulsa, Okla.
Supts., D. V. Eells, Okmulgee, Okla.; Lee Haugen, Ponca City, Okla.; E. H. Roy, East Chicago, Ind.
Asst. Supts., C. O. Bailey, Okmulgee, Okla.; N. B. Lau Bach, Ponca City, Okla.; B. H. Mylius, Ponca City, Okla; R. S. Ross, Ponca City, Okla.; John D. Snakenberg, East Chicago, Ind.; A. Y. Gunter, East Chicago, Ind.
Refineries located at Okmulgee, Okla.; Ponca City, Okla.; East Chicago, Ind.; Gainesville, Tex.

Envoy Petroleum Co., 3000 Walnut Ave., Long Beach, Calif.
Pres., A. M. Lockhart
V. P., H. J. Witz
Sec., W. S. Wilsey
Treas. and Gen. Mgr., A. M. Lockhart
Gen. Supt. Ref., W. F. Emory
Tankcar S. M., A. M. Lockhart
Ch. Chem., W. A. Shaffer
Pur. Agt., W. S. Wilsey
Refinery located at Long Beach, Calif.

Estado Petroleum Corp., Ltd., 1315 E. Hill St., Long Beach, Calif.
Pres., L. Y. Mattes
V. P., E. E. Greiner
Sec. and Treas., H. Hartsock
Gen. Mgr., L. Y. Mattes
Gen. Supt. Ref., E. E. Greiner
Ch. Chem., S. A. Blocher
Pur. Agt., E. E. Greiner
Asst. Supt., T. G. Stickels
Refinery located at Long Beach, Calif.

Exchange Petroleum Corp., The, P.O. Box 817, Albany, Tex.
Pres., A. A. Spencer
V. P., I. White
Sec. and Treas., H. A. Spencer
Gen. Mgr., A. A. Spencer
Gen. Supt. of Ref., C. C. White
Tankcar and Sta. S. M., A. A. Spencer
Ch. Chem., E. J. White
Refinery located at Albany, Tex.

Exeter Refining Co., 5843 Paramount Blvd., Long Beach, Calif.
Pres., Carl von Bibra
V.P. and Treas., Earle F. Demond
Sec., Harold E. Thomas
Ref. Mgr., N. F. Gallucci
Ch. Chem., John Klein
Refinery located at North Long Beach, Calif.

F

Falcon Refining Co., The, Box 773, Great Bend, Kans.
Pres., H. A. Diceson
Sec., R. W. Morris
Gen. Supt. Ref., John Grubb
Station S. M., R. W. Morris
Ch. Chem., John Grubb
Traf. Mgr., N. Kennan
Asst. Supt., R. W. Russell
Refinery located at Great Bend, Kans.

Falls Refining Co., Inc., Box 508, Wichita Falls, Tex.
Pres., J. E. Parker
V. P., H. T. Parker
Refinery located at Wichita Falls, Tex.

Fern Oil Co., The, Thermopolis, Wyo.
Pres., Bruce Sullivan
Plant shut down pending outcome of litigation.

Fletcher Oil Co., Inc., 4037 Bandini Blvd., Los Angeles, Calif.
Pres., D. S. Fletcher
V. P., F. O. Fletcher
Sec., Emily Pece
Gen. Mgr., A. R. Hudgins
Refinery located at Los Angeles, Calif.

Franklin Creek Refining Corp., 88 Lexington Ave., New York, N. Y.
Pres., Dr. Ferdinand Sonneborn
V. P., J. F. Roten
Sec., R. G. Sonneborn
Treas., Max Pick
Gen. Mgr., C. H. Alsberg
Tankcar S. M., C. F. Felton
Ch. Engr., C. H. Alsberg
Ch. Chem., T. G. Murphy
Pur. Agt., C. H. Alsberg
Traf. Mgr., C. H. Kingsley
Supt., C. H. Goss, Franklin, Pa.
Asst. Supt., D. S. Bleakley, Franklin, Pa.
Refinery located at Franklin, Pa.

Franklin, Wirt, Petroleum Corp., Box 966, Ardmore, Okla.
Pres., Wirt Franklin
V. P., F. M. Porter
Tankcar S. M., C. A. Franklin
Refinery located at Ardmore, Okla.

Fredonia Oil & Refining Co., Box 63, Fredonia, Kans.
Pres., D. W. Crumley, Chanute, Kans.
Sec., Raymond Justice
Refinery located at Fredonia, Kans.

Freedom Oil Works Co., The, Third Ave., Freedom, Pa.
Pres., Earle M. Craig
V.P., Albert B. Craig
Sec. and Treas., C. E. McKee
Tankcar S. M., R. B. McKee
Service Sta. S. M., E. N. McDonald
Ch. Chem., A. M. Crittenden
Pur. Agt., G. J. Mohr
Traf. Mgr., E. W. Neihaus
Supt., B. L. Heath
Refinery located at Freedom, Pa.

G

Gainesville Refining Corp., Twenty-second Floor, First National Bldg., Oklahoma City, Okla.
Pres., R. G. Rapp
V. P., H. E. Rapp
Sec. and Treas., S. Williams
Gen. Supt. Ref., G. W. Mattson
Tankcar S. M., C. W. Anderson
Pur. Agt., Frank Wade
Refinery located at Gainesville, Tex.

General American Oil Co., Shreveport, La.
Chm. of Bd., J. W. Gilliland
Pres., R. G. Trippett
Sec. and Treas., A. H. Meadows
Refineries located at Arp, Overton and Gladewater, Tex.

General Petroleum Corp. of California, 108 West Second St., Los Angeles, Calif.
Pres., A. L. Weil
V.P.'s, R. A. Sperry, E. L. Adams, W. L. McLaine, S. J. Dickey, A. H. DeFriest
Sec., D. W. Woods
Treas., W. Cunningham
Gen. Mgr., R. A. Sperry
Mgr. of Mfg., S. J. Dickey
Sales Mgr., A. H. DeFriest
Ch. Engr., V. F. Grace
Ch. Chem., G. F. Olsen
Pur. Agt., R. M. Ketchum
Traf. Mgr., C. E. Zeigler
Supts., Fred Isaacs, Vernon and Torrance, Calif.; R. C. Wheeler, Lebec, Calif.
Asst. Supts., W. M. McElroy, Vernon and Torrance, Calif.; P. S. Magruder, Lebec, Calif.
Refineries located at Vernon, Torrance and Lebec, Calif.

Gillette Refining Co., Box 761, Sheridan, Wyo.
Gen. Mgr., V. C. Langford
Sec. and Treas., J. B. Ricketts
Gen. Mgr., V. C. Langford
Supts., V. C. Langford, Sheridan, Wyo.; John Silby, Gillette, Wyo.
Refineries located at Sheridan and Gillette, Wyo.

Gilmore Oil Co., 2423 E. Twenty-eighth St., Los Angeles, Calif.
Pres., E. B. Gilmore
V.P. and Gen. Mgr., C. S. Beesemyer
Sec., S. M. Salisbury
Gen. Supt., H. L. Eggleston
Ch. Chem., R. H. Pierson
Service Station S. M., B. A. Rowell
Pur. Agt., D. H. F. MacPherson
Traf. Mgr., P. H. Moore
Refineries located at Roadamite and Los Angeles, Calif.

Globe Oil & Refining Co. (Ill.), The, Union National Bldg., Wichita, Kans.
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V. P., F. L. Jehle
Sec. and Treas., G. G. Woodruff, Chicago, Ill.
Asst. Sec. and Treas., R. E. Everitt
Gen. Mgr., F. L. Jehle
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Supt., H. B. Overton, Lemont, Ill.
Refinery located at Lemont, Ill.

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V. P., F. L. Jehle
Sec. and Treas., J. F. O'Shaughnessy
Gen. Mgr., F. L. Jehle
Tankcar S. M., A. E. Landsittel
Asst. S. M., George C. Jehle
Ch. Engr., S. P. Redfearn
Ch. Chem., C. W. Berger
Pur. Agt., E. J. Mary
Traf. Mgr., E. R. Walcher
Supt., E. J. Mary, McPherson, Kans.
Refinery located at McPherson, Kans.

Globe Oil & Refining Co. (Okla.), The Union National Bank Bldg., Wichita, Kans.

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V. P., F. L. Jehle
Sec., R. E. Everitt
Treas., E. A. Lentz
Gen. Mgr., F. L. Jehle
Tankcar S. M., A. E. Landsittel
Asst. S. M., George C. Jehle
Ch. Chem., A. A. Gilbert
Pur. Agt., R. D. McCrum
Traf. Mgr., E. R. Walcher
Supt., R. D. McCrum, Blackwell, Okla.
Refinery located at Blackwell, Okla.

Golden Bear Oil Co., Ltd., 606 Union Bank Bldg., Los Angeles, Calif.

Pres., S. R. Roseberg
V. P.'s, J. M. Feldman, Chas. P. Prewett
Sec. and Treas., Louis L. Swarthe
Gen. Mgr., J. M. Feldman
Gen. Supt. of Ref., Chas. P. Prewett, Oildale, Calif.
Refinery located at Oildale, Calif.

Golden Rule Oil Co., 120 West First St., Wichita, Kans.

Pres. and Gen. Mgr., Elbert S. Rule
V. P., Mildred R. Olson
Sec. and Treas., Roy E. Stewart
Tankcar and Station S. M., Roy E. Stewart
Ch. Chem., Vern Luthy
Pur. Agt., Roy E. Stewart
Traf. Mgr., Roy E. Stewart
Refinery located at North Wichita, Kans.

Government Refining Co., 2109 First National Bldg., Oklahoma City, Okla.

Pres., Robert A. Wallace
Sec., Nellie Mae Creech

Graford Refining Co., Mineral Wells, Tex.

Owner, S. E. Richardson
Refinery located at Mineral Wells, Tex.

Gratex Refining & Fuel Oil Co., Box 307, Graham, Tex.

Gen. Mgr., G. O. Cozart
Tankcar S. M., E. R. Marchman
Refinery located at Graham, Tex.

Gray Refinery, Inc., Newcastle, Wyo.

Pres., D. O. Gray
V. P., Prestone T. McAvoy
Sec. and Treas., E. Mae Gray
Gen. Supt. Ref., W. D. Gray
Refinery located at Newcastle, Wyo.

Greenville Refining Co., Inc., Greenville, Ky.

Pres., W. C. Malone
Sec. and Treas., H. E. Eaves, Jr.

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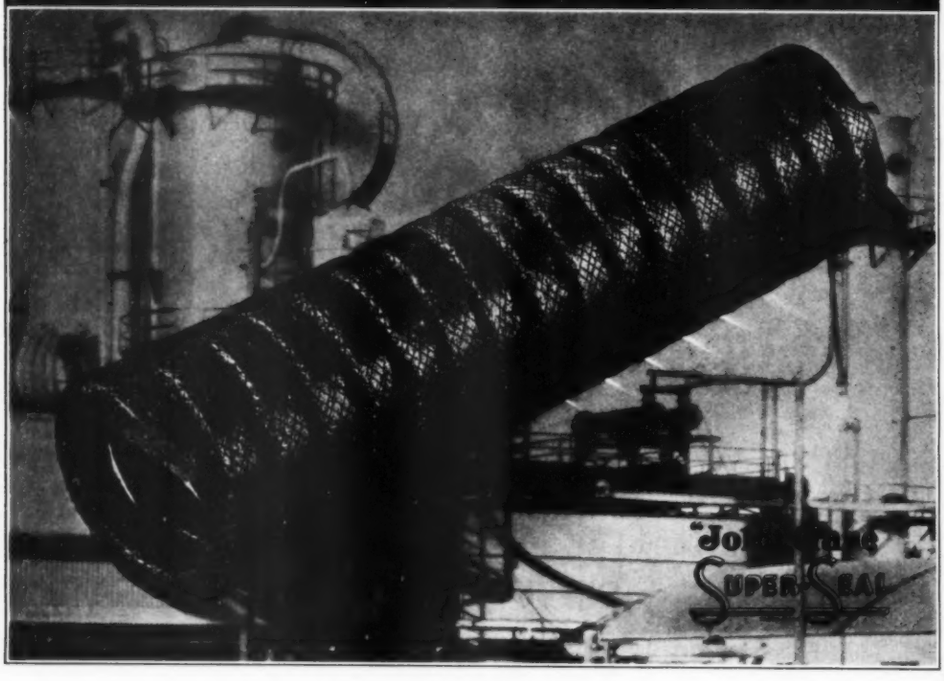

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Gen. Mgr., J. A. Bowden
Gen. Supt. Ref., C. L. Hilgenfeld
Tankcar S. M., C. D. Tinsley
Station S. M., H. J. VanDyke, Jr.
Ch. Engr., C. L. Hilgenfeld
Pur. Agt., J. A. Bowden
Traf. Mgrs., J. B. Thomas and J. F. Smith
Asst. Supts., C. A. Petty, Shreveport, La.; W. E. Scott, Rodessa, La.
Refineries located at Shreveport, La., and Rodessa, La.

Gulf Oil Corp. & Gulf Refining Co., P.O. Box 1166, Pittsburgh, Pa.

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V. P.'s, Charles B. Buerger, W. V. Hartmann
V. P. and Comptroller, H. A. Gidney
Sec., W. J. Guthrie
Treas., J. E. Nelson
Gen. Mgr., Wm. A. Slater
Mgr. of Refined Oil Sales, H. C. Meyer, C. M. Gile
Mgr. of Lube Oil Sales, H. P. Hobart
Mgr. of Fuel Oil Sales, R. M. Bartlett
Mgr. Engr. & Const., Herbert Henderson
Mgr. Ref. Tech., H. G. Smith
Pur. Agt., C. T. Marsh
Traf. Mgr., A. J. Bessolo
Gen. Supt., T. J. Sullivan, Port Arthur, Tex.
Ref. Mgr., H. V. Sanderson, Staten Island, N. Y.
Supts., Wm. M. Braybrooks, Staten Island, N. Y.; W. M. Crockett, Philadelphia, Pa.; M. J. Ball, Pittsburgh, Pa.; R. C. Faulkner, Toledo, Ohio; T. J. Twomey, Cincinnati, Ohio
Asst. Supts., G. I. Roberts and B. H. Barnes, Port Arthur, Tex.; H. Taylor, Fort Worth, Tex.; J. W. Schriever, Sweetwater, Tex.; J. E. Biggins, Philadelphia, Pa.; J. H. Wackenhut, Pittsburgh, Pa.; J. O. Timms, Toledo, Ohio; A. A. Niehenke, Cincinnati, Ohio.
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H

Hancock Oil Co. of Calif., The, P.O. Box 810, Long Beach, Calif.

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V. P.'s, G. P. Deane, E. E. Pyles
Sec., John W. Hancock
Treas., G. P. Deane
Gen. Mgr., Will J. Reid
Gen. Supt. Ref., W. T. Hancock
Tankcar and Station S. M., C. B. Limbocker
Ch. Engr., H. T. Boehme
Ch. Chem., Laverne Smith
Pur. Agt., W. T. Westergard
Refinery located at Long Beach, Calif.

Hanners Oil Co., Elsie, Mich.

Pres. and Gen. Mgr., George Hanners, Saginaw, Mich.
V. P.'s, Clarence E. Larsen, Detroit; Arthur J. Rohde, Detroit
Sec. and Treas., Frank W. Donovan, Detroit
Gen. Supt. Ref., Harry H. Crell, Elsie
Tankcar and Station S. M., C. L. Skidmore, Royal Oak
Ch. Engr., Harry H. Crell, Elsie
Pur. Agt., Frank E. Renner, Alma
Refinery located at Elsie, Mich.

Harbor Refining Co., Inc., 2240 South St., Long Beach, Calif.

Pres., H. A. McOwen
V. P.'s, D. D. Dunlap, O. M. Slosson
Sec., C. E. Duke
Gen. Mgr., H. A. McOwen
Gen. Supt. Ref., Harold Beckley
Refinery located at Long Beach, Calif.

Hart Refineries, Missoula, Mont.

Pres., C. W. Hart
Sec. and Treas., E. G. Hart
Refineries located at Missoula and Hedgesville, Mont.

Hawley, Ted, Gallup City, Mont.

Owner, Ted Hawley
Refinery located at Gallup City, Mont.

Hightower Oil & Refining Corp., P.O. Box 830, Brownwood, Tex.

Pres., J. A. Watt
V. P.'s, A. W. Watt, H. W. Greenwood
Sec., C. D. Anderson
Treas., H. W. Greenwood
Gen. Mgr., J. A. Watt
Gen. Supt. Ref., C. Stuart
Tankcar and Station S. M., C. D. Anderson
Ch. Chem., Dewey K. Lee
Pur. Agt., C. D. Anderson
Traf. Mgr., R. W. Peavy
Refinery located at Brownwood, Tex.

Hill Refining Co., Ballinger, Tex.

Roy L. Hill, sole owner

Hole Brothers Refinery, Cut Bank, Mont.

Partnership, B. V. Hole, Sr.: S. A. Hole; I. M. Hole
Supt., I. M. Hole
Refinery located at Cut Bank, Mont.

Home Oil & Refining Co., Great Falls, Mont.

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V. P., John S. Rice
Sec., Fred Erickson
Gen. Mgr., H. O. Batzer
Gen. Supt. Ref., Gray Rankin
Tankcar S. M., H. O. Batzer
Pur. Agt., John S. Rice
Supts., Gray Rankin, Great Falls, Mont.; Carl Woods, Conrad, Mont.
Refineries located at Great Falls, Mont., and Conrad, Mont.

Hot Springs Refining Co., Hot Springs, S. Dak.

Pres., E. M. Wells
V.P. and Treas., C. L. Foster
Sec., C. M. Wells
Gen. Mgr. and Gen. Supt. Ref., E. M. Wells
Refinery located at Hot Springs, S. Dak.

Houston Oil Co. of Texas, Box 2412, Houston, Tex.

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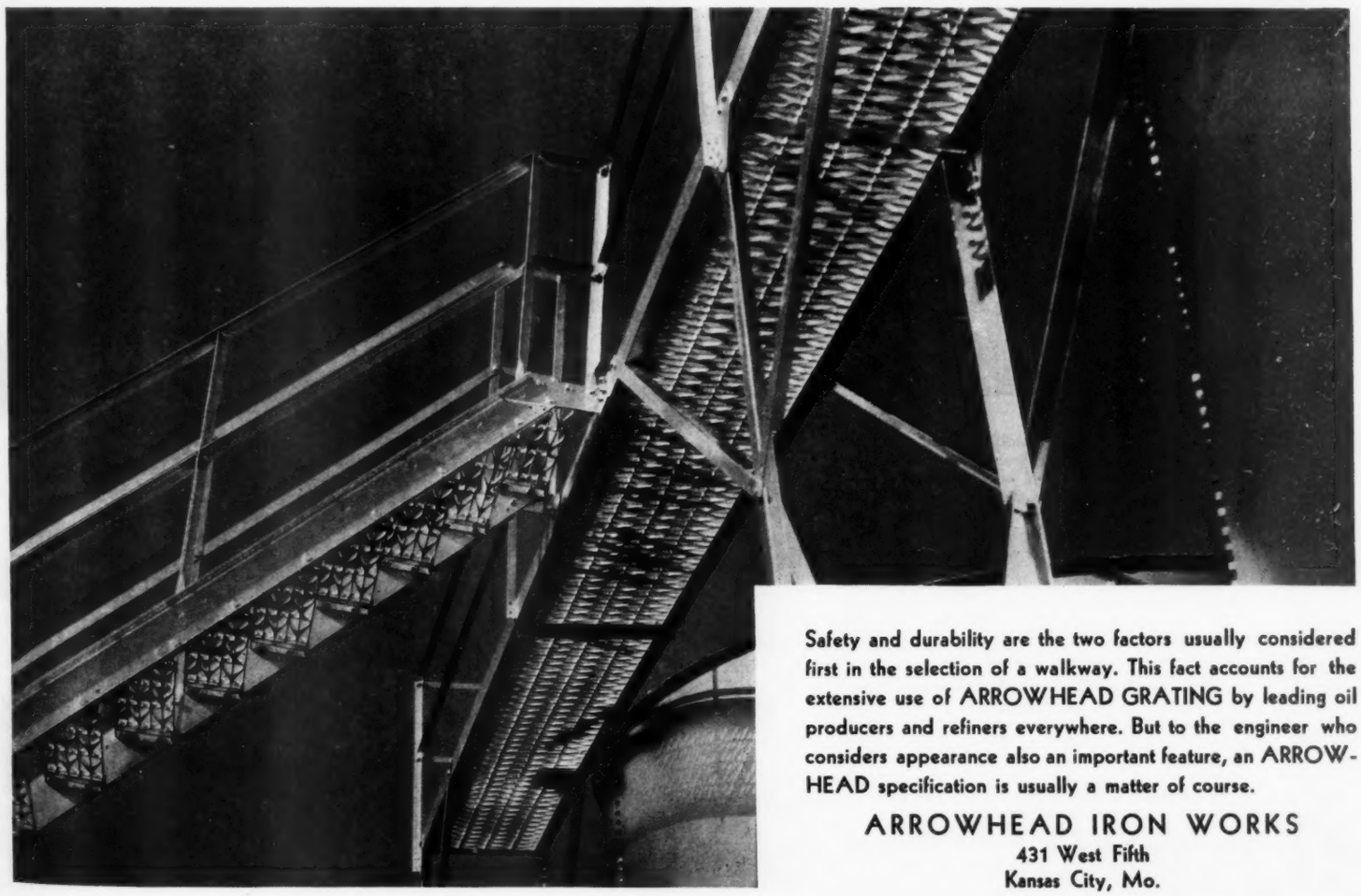
V. P., L. S. Zimmerman, 808 Maryland Trust Bldg., Baltimore, Md.
Sec., A. H. Kennerly
Treas., L. S. Zimmerman
Gen. Mgr., R. R. Hobson
Gen. Supt. Ref., F. Y. Hutchison
Tankcar and Service Station S. M., J. B. Benson
Ch. Engr., F. Y. Hutchison
Ch. Chem., R. H. Cook
Pur. Agt., O. S. Cummings, Jr.
Traf. Mgr., P. W. Schumacher
Supt., Geo. H. Hartung, Viola, Tex.
Refineries located at Viola, Tex., and Camden, Ark.

Howard County Refining Co., Big Spring, Tex.

Pres., Robert T. Piner
Sec. and Treas., G. H. Hayward
Gen. Mgr., Joseph Edwards
Gen. Supt. Ref., F. R. McGee
Tankcar and Station S. M., J. Henry Edwards
Pur. Agt., J. Henry Edwards
Traf. Mgr., Robert R. Hodge
Refinery located at Big Spring, Tex.

Humble Oil & Refining Co., Box 2180, Houston, Tex.

Pres., R. L. Blaffer



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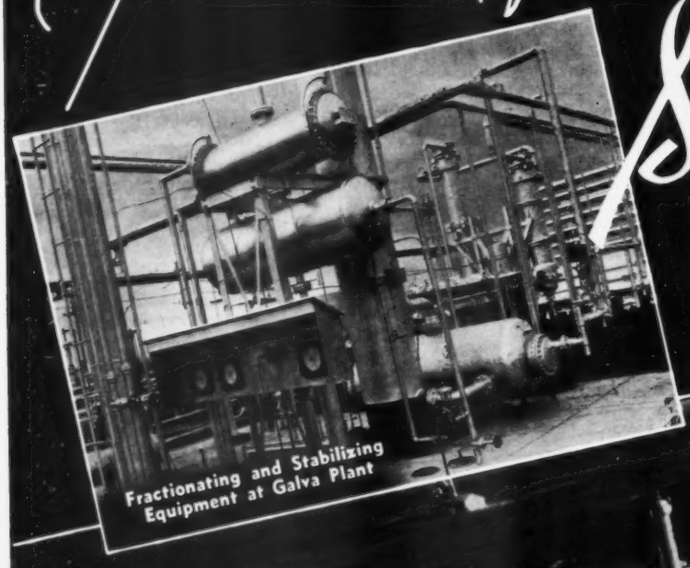

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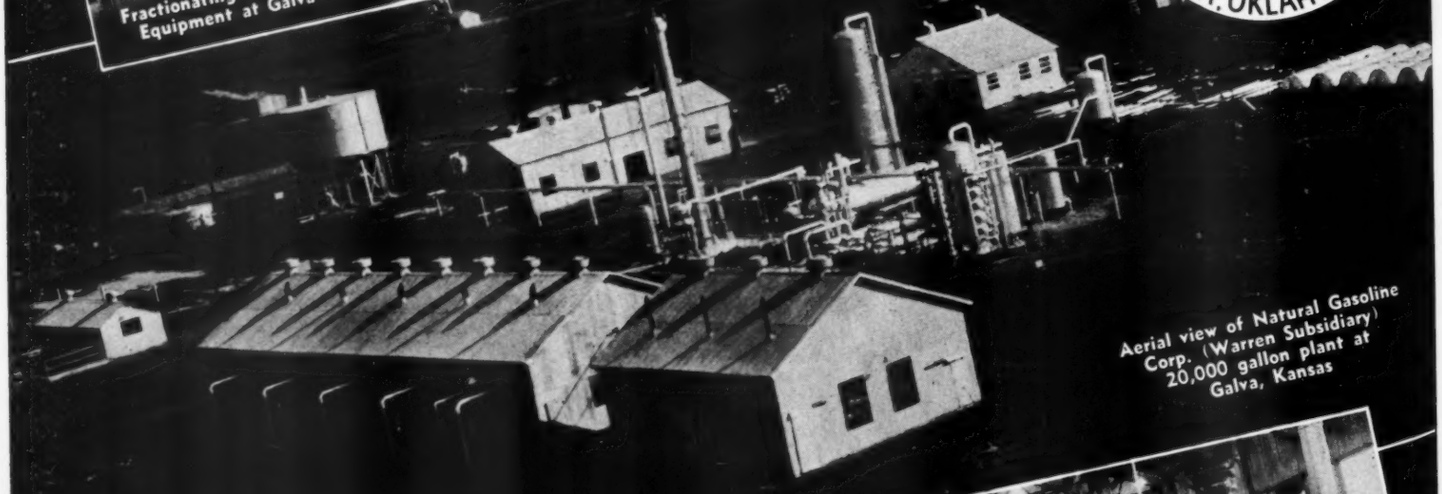

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Battery of 300 H. P. Direct Driven Compressors at Galva Plant

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Tankcar Sales, R. M. Stephens
Ch. Engr., Dr. E. F. Voss
Ch. Chem., Dr. H. D. Wilde, Jr.
Pur. Agt., J. A. Rowe
Traf. Mgr., J. R. Davis
Supts., G. L. Farned, Baytown, Tex.; H. F. Goss, Ingleside, Tex.; C. M. Bell, San Antonio, Tex.; C. M. Dennison, Neches, Tex.
Asst. Supts., M. L. Snyder, James Harrop, C. E. Carleson, W. P. Willis, all of Baytown, Tex.
Refineries located at Baytown, Tex.; Ingleside, Tex.; San Antonio, Tex.; Neches, Tex.

Hunt, Eugene, 222 Second Ave., South, Lewistown, Mont.

Gen. Mgr., Eugene Hunt
Gen. Supt. Ref., Eli LeDoux, Winnett, Mont.
Refinery located at Winnett, Mont.

Hurricane Petroleum Corp., Box 38, Shreveport, La.

Pres., M. J. Grogan
V. P., B. P. Crittenden
Sec., M. T. McGown
Treas., T. H. Grobe
Gen. Mgr., B. P. Crittenden
Gen. Supt. Ref., J. A. O'Neill, Overton, Tex.
Tankcar and Station S. M., W. F. Kostelka
Pur. Agt., O. F. Shaver
Traf. Mgr., C. C. Correll
Refineries located at Overton, Tex., and Arp, Tex.

I

Illinois Oil Co., Rock Island, Ill.

Pres., Frank P. Welch
V. P., J. W. Armstrong
Sec. and Treas., F. R. Edwards
Gen. Mgr., Frank P. Welch
Gen. Supt. Ref., P. J. Glover, Cushing, Okla.
Tankcar and Station S. M., F. R. Edwards
Ch. Engr., W. W. Kelly, Cushing, Okla.
Pur. Agt. for Refinery, P. J. Glover, Cushing, Okla.
Traf. Mgr., P. J. Glover, Cushing, Okla.
Supt., W. W. Kelly, Cushing, Okla.
Refinery located at Cushing, Okla.

Ina Oil & Refining Co., Milam Bldg., San Antonio, Tex.

Owners, F. M. Shaver and G. Tiffeny
Refinery located at Hondo, Tex.

Independent Refining Co., Box 1535, Billings, Mont.

Pres., W. E. Rice
V. P., D. E. Hageman
Sec., H. J. Coleman
Treas., D. E. Hageman
Gen. Mgr., D. E. Hageman
Gen. Supt. Ref., W. D. Manz
Tankcar and Station S. M., D. E. Hageman
Ch. Chem., J. M. Williams
Pur. Agt., P. A. Thomson
Traf. Mgr., P. A. Thomson
Refinery located at Laurel, Mont.

Indian Refining Co., Lawrenceville, Ill. (Subsidiary of the Texas Corp.)

Pres., W. S. S. Rodgers
V. P.'s, P. C. Scullin, H. W. Dodge, F. T. Manley, S. B. Wright
Sec., E. M. Crone
Treas., C. E. Woodbridge
Mgr. Ref. Dept., F. T. Manley
Supt., G. R. Bryant
Sales Dept., S. B. Wright
Pur. Agt., A. F. Colling, 135 East 42nd St., New York
Refinery located at Lawrence, Ill.

Inland Refineries, Inc., 1258 Penobscot Bldg., Detroit, Mich.

Pres., C. L. Skidmore
V. P., Paul Martin
Sec., B. F. Hall
Refinery located at Pontiac, Mich.

Inter-Lakes Refining Co., 1205 Kales, Detroit, Mich.

Pres., Bernard L. Snyder
V. P., West H. Gallogly
Sec., Edward H. Yost
Treas., Roland O'Niel
Gen. Supt. Ref., West H. Gallogly
Tankcar S. M., Bernard L. Snyder
Ch. Engr., William Degnen
Ch. Chem., William Degnen
Pur. Agt., Bernard L. Snyder
Traf. Mgr., E. Bishop
Supt., J. Pokarney, Flat Rock, Mich.
Refinery located at Flat Rock, Mich.

J

Jacksboro Refining Co., Jacksboro, Tex.

Owner, P. R. Tautenhalm
Refinery located at Jacksboro, Tex.

Johnson, A. L., Bryant Ave., Wayne, Ohio

Owner, A. L. Johnson
Refinery located at Wayne, Ohio

Johnson Oil Refining Co., 176 West Adams St., Chicago, Ill.

Pres., I. H. Johnson
V. P., L. Ralph Johnson, Cleveland, Okla.
Sec., G. C. Lilly
Treas., J. O. Horton
Gen. Mgr., I. H. Johnson
Gen. Supt. Ref., L. Ralph Johnson, Cleveland, Okla.
Tankcar S. M., H. G. Plane
Station S. M., H. A. Jones
Ch. Chem., Frank P. Frey, Cleveland, Okla.
Pur. Agt., V. C. Goward, Cleveland, Okla.
Traf. Mgr., G. A. Mindeman, Cleveland, Okla.
Supt., William J. Leenhouts, Cleveland, Okla.
Asst. Supt., R. B. Fowler, Cleveland, Okla.
Refinery located at Cleveland, Okla.

Joplin Refining Co., Box 155, Joplin, Mo.

Gen. Mgr., Joseph F. Jones
Gen. Supt. Ref., Richard O'D. Jones
Tankcar S. M., Joseph F. Jones
Ch. Engr., John Johnson
Pur. Agt., Joseph F. Jones
Refinery located at Joplin, Mo.

K

Kanotex Refining Co., The, Box 454, Arkansas City, Kans.

Pres., C. M. Boggs
V. P., W. L. Lesh
Sec., E. K. Childers
Treas., R. R. Cox
Gen. Mgr., C. M. Boggs
Gen. Supt. Ref., F. A. Deering
Sales Mgr., W. L. Lesh
Asst. Sales Mgr., T. A. Eustice
Ch. Engr., D. O. Givens
Ch. Chem., G. S. Kirk
Pur. Agt., L. E. Watts
Traf. Mgr., C. E. Varner
Asst. Supt., C. F. Wakefield
Refinery located at Arkansas City, Kans.

K. D. Refining Co., Talco Tex.

Owner, R. S. Knight
Refinery located at Talco, Tex.

Kendall Refining Co., Bradford, Pa.

Pres., Otto Koch
V.P.'s, Joseph H. Bovaird, Howard H. Greene
Sec., J. Bertram Fisher
Treas., Otto Koch
Gen. Mgr., Otto Koch
Ref. Mgr., Earl E. Bown
Lube Oils S. M., T. O. Grisell
Service Station S. M., J. Bertram Fisher
Plant Engr., S. M. Wolbert
Ch. Chem., W. B. McCluer
Control Chem., Cedric E. Hulme
Pur. Agt., J. Bertram Fisher
Traf. Mgr., James S. White
Refinery located at Bradford, Pa.

Kent Refining Co., Corsicana, Tex.

Mgr., L. M. Fauber
Asst. Mgr., J. S. Daniel, Jr.
Refinery located at Angus, Tex.

Keystone Oil Refining Co., 12800 Northampton, Detroit, Mich.

Pres., William Fisher
V.P., Nathan R. Epstein
Sec., Leon Komisaruk
Treas and Gen. Mgr., William Fisher
Gen Supt. Ref., Leon Komisaruk
Tankcar and Service Station S. M., Maurice S. Schiller
Ch. Engr., William H. Osborn
Ch. Chem., Amos Comay
Pur. Agts., William Fisher, Leon Komisaruk
Traf. Mgr., Theodore Bissell
Asst. Supt., William H. Osborn
Refinery located at Detroit, Mich.

Kolingo Refining Co., Coalinga, Calif.

Refinery located at Coalinga, Calif.

Knox Refining Co., Box 942, Enid, Okla.

Gen. Mgr., Roy E. Raemer
Gen. Supt. Ref., C. D. West
Pur. Agt., Roy E. Raemer
Refinery located at Covington, Okla.

L

Lake View Oil & Refining Co., 1007 Edwards & Wildey Bldg., Los Angeles, Calif.

(In receivership)
Receiver, Paul J. Hisey
V.P., A. J. Rehwold
Sec., Paul J. Hisey
Treas., C. F. Powers
Refinery located at Maricopa, Calif.

La Salle Petroleum Co., 612 Wright Bldg., Tulsa, Okla.

Receivers, W. J. Schnut, Tulsa, Okla.; Phil. D. Williams, Burkburnett, Tex.
Gen. Mgr., W. J. Schnut
Gen Supt. Ref., Phil D. Williams
Tankcar and Station S. M., Phil D. Williams
Refinery located at Burkburnett, Tex.

Leonard Refineries, Inc., Alma, Mich.

Pres., J. W. Leonard, Jr.
V. P., B. M. Jones
Off. and Credit Mgr., Chas. E. Harris
Sec., Treas., and Gen. Mgr., John F. Martin
Supt., Reid Brazell
Tankcar and Ser. Sta. S. M., M. D. Vanderley
Ch. Chem., F. W. Eley
Pur. Agt., Chas. E. Harris
Refinery located at Alma, Mich.

Lion Oil Refining Co., Exchange Bldg., El Dorado, Ark.

Pres., T. H. Barton
V. P.'s, T. M. Martin, J. J. Allinson, A. F. Reed
Sec., Jeff Davis
Treas., R. E. Meinert
Gen. Mgr., T. M. Martin
Ref. Mgr., J. J. Allinson
Tankcar and Station S. M., A. F. Reed
Ch. Engr., J. B. Rogerson
Ch. Chem., W. M. Carney
Pur. Agt., R. E. Meinert
Traf. Mgr., P. G. Anderson
Supt., J. B. Rogerson
Refinery located at El Dorado, Ark.

Louisville Refining Co., 411 American Life Bldg., Louisville, Ky.

Pres., Eli H. Brown, Jr.
V. P., J. Fred Miles
Sec. and Treas., H. R. Smith
Gen. Mgr., J. Fred Miles
Tankcar S. M., H. R. Smith
Ch. Engr., E. S. Handley
Ch. Chem., A. R. Green
Pur. Agt., W. A. Waples
Traf. Mgr., H. R. Smith
Supt., J. J. Loudermill
Refinery located at Louisville, Ky.

L R C Refinery, Roundup, Mont.

Owner, L. Ray Carroll
Refinery located at Roundup, Mont.

Mc

McCallen, M. M., Refining & Producing Co., Box 572, Huntington Beach, Calif.

Owner, M. M. McCallen
Gen. Supt. Ref., P. L. Davis
Ch. Chem., Roy Seabridge
Pur. Agt., Roy Seabridge
Refinery located at Huntington Beach, Calif.

McClanahan Refineries, Inc., St. Louis, Mich.

Pres., W. L. McClanahan
V. P.'s, Eshern Hanson, D. E. Foster
Sec., Grant L. Cook
Treas., D. W. Ledbeter
Gen. Mgr., D. E. Foster
Gen. Supt. Ref., M. C. Sumpter
Tankcar and Station S. M., L. R. Kampermann
Traf. Mgr., M. Lowe
Refinery located at St. Louis, Mich.

McGarr Petroleum Corp., Box 56, Kline, Colo.

Pres., G. M. McGarr
V.P., A. L. Kroeger
Sec. and Treas., Ruth Z. Brazil
Gen. Mgr., G. M. McGarr
Supt., G. M. McGarr
Refinery located at Marvel, Colo.

McKain Refining Co., P.O. Box 1157, Gladewater, Tex.

Owner, William H. McKain
Refinery located at Gladewater, Tex.

McNutt Oil & Refining Co., Box 1161, El Paso, Tex.

Pres., C. M. McNutt
V. P., C. E. McNutt
Sec., J. T. McNutt
Treas., C. B. McNutt
Gen. Mgr., C. M. McNutt
Gen. Supt. Ref., C. E. McNutt
Tankcar S. M., C. M. McNutt
Ch. Engr., C. E. McNutt
Asst. Supt., G. A. Baker
Refinery located at Brickland, N. Mex.

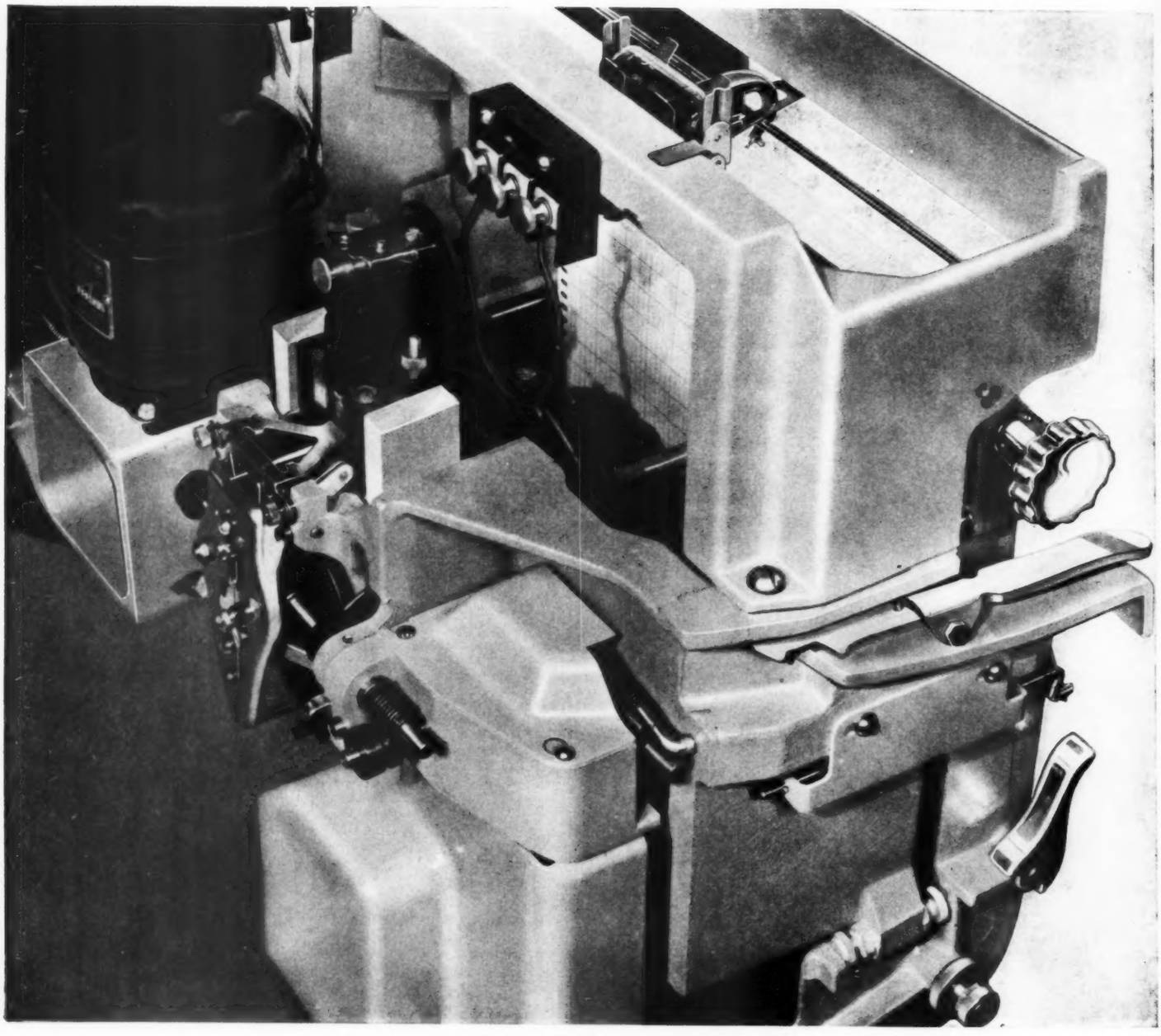
M

Macmillan Petroleum Corp., 530 West Sixth St., Los Angeles, Calif.

Pres., R. S. Macmillan
V.P.'s, H. R. Macmillan, M. P. Macmillan, S. M. Batterson, H. E. Bonner, L. M. Barton
Sec. and Treas., DeWitt Knox
Gen. Supt. Ref., H. E. Bonner
Tankcar S. M.'s, L. M. Barton, Los Angeles; S. M. Batterson, El Dorado, Ark.
Service Sta. Supervisor, L. J. Gilmer
Ch. Engr., C. C. Benz
Ch. Chem., S. E. Campbell, El Dorado, Ark.
Supts., L. L. Rebber, Norphlet, Ark.; DeRalph Frizell, Long Beach, Calif.
Asst. Supts., William Powell, Norphlet, Ark.; George Ray, Long Beach, Calif.
Refineries located at Norphlet, Ark.; Signal Hill, Calif.; Borger, Tex.

Magnolia Petroleum Co., Box 900, Dallas, Tex.

Pres., D. A. Little
V. P., L. S. Sinclair
Sec., G. L. Tate
Treas., W. L. Holmes
Gen. Mgr. Ref., E. E. Swope
Tankcar S. M., George Miller
Station S. M., F. M. Lege, Jr.
Ch. Engr., C. A. Knight
Ch. Chem., P. L. Smith
Pur. Agt., E. W. Gross
Traf. Mgr., J. D. Hurst
Supts., R. R. Jackson, Beaumont, Tex.; John Ricker, Fort Worth, Tex.; C. S. Dickens, Corsicana, Tex.; J. T. Dickens, Luling, Tex.



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Reliability . . . THE FIRST CONSIDERATION

Parts are strong machine types, unique in the instrument art. The materials of which they are constructed have been chosen as a result of exhaustive tests in actual service. Many are heat-treated in Hump-Vapocarb Furnaces. Factors of safety in all are large. Reliability is the first consideration.

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LEEDS & NORTHRUP COMPANY
4959 STENTON AVENUE PHILADELPHIA, PA.

LEEDS & NORTHRUP

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

Asst. Supts., T. E. Schley, Beaumont, Tex.: N. B. Marchbanks, Fort Worth, Tex.; A. L. Hardy, Luling, Tex.
Refineries located at Beaumont, Tex.; Fort Worth, Tex.; Corsicana, Tex.; Luling, Tex.

Maleo Refineries, Inc., P.O. Box 26, Artesia, N. Mex.

Pres., M. E. Barsh
V. P., L. R. Simon
Sec. and Treas., R. A. Shugart
Gen. Mgr., M. E. Barsh
Gen. Supt. Ref., L. R. Simon
Tankcar S. M., R. L. Halley
Ch. Engr., L. R. Simon
Ch. Chem., A. C. Sturgis
Pur. Agt., R. A. Shugart
Traf. Mgr., R. A. Shugart
Refinery located at Artesia, New Mex.

Martin Refining Co., Gladewater, Tex.

Pres., T. R. Martin
Ch. Chem., H. L. Kerr
Supt., Fred N. Williams
Plant located at Gladewater, Tex.

Master Petroleum Co., 401 Amicable Bldg., Waco, Tex.

Sec., Floyd Casey
Refinery located at Waco, Tex.

Mentone Oil & Refining Co., Mentone, Tex.

Partners, H. C. Chaddick and E. T. Barker, Jr.
Refinery located at Arno, Tex.

Mercury Petroleum Corp., Box 71, Venice, Calif.

Pres., H. H. Biber
V.P.'s, J. M. Stump, D. E. Biber
Sec. and Treas., D. E. Biber
Gen. Mgr., H. H. Biber
Gen. Supt. Ref., H. H. Biber
Tankcar and Service Station S. M., D. E. Brown
Supt., F. Mangold, Venice, Calif.
Refinery located at Venice, Calif.

Mid-Continent Petroleum Corp., Cosden Bldg., Tulsa, Okla.

Pres., Jacob France
V.P.'s, J. C. Denton, F. B. Koontz, R. W. McDowell, George O. Moody, Jess Scarborough
Sec., E. M. Rouzer
Treas., Charles Klein
Gen. Supt. Ref., F. B. Koontz
Tankcar and Service Station S. M., R. W. McDowell
Ch. Chem., H. T. Bennett
Pur. Agt., C. A. Prichard
Traf. Mgr., H. W. Roe
Refinery located at West Tulsa, Okla.

Middlesex Refining Co., 60 East 42nd St., New York, N. Y.

Pres. and Gen. Mgr., Thomas Graham
V. P., William B. Davis
Sec. and Treas., R. W. Peckham
Ch. Engr., George Benhoff
Refinery located at Pescataway, N. J.

Midland Oil Refining Co., 2300 Clermont St., Denver, Colo.

Pres., L. M. Hines
Sec. and Treas., L. R. Hines
Gen. Mgr., L. M. Hines
Refinery located in Denver, Colo.

Midway Refining Co., Coleman, Tex.

Owners, Ray McGlothlin and T. S. Jones
Refinery located at Coleman, Tex.

Midwest Refineries, Inc., Alma, Mich.

Pres., Ben J. Skinner
V. P., T. E. McFall
Sec. and Treas., F. S. Grimes
Gen. Mgr., Ben J. Skinner
Gen. Supt. of Ref., John G. Marshall
Tankcar S. M., F. S. Grimes
Ch. Engr., John G. Marshall
Traf. Mgr., V. M. Skinner
Supt., John G. Marshall
Asst. Supt., B. E. Thurston
Refinery located at Alma, Mich.

Mission Oil Co., P.O. Box 231, Thermopolis, Wyo.

Pres., Geo. W. Garrison
V. P.'s, D. L. Joehack, Fern Sullivan
Sec., C. L. Sullivan
Treas., Geo. W. Garrison
Gen. Mgr., Bruce Sullivan
Gen. Supt. of Ref., C. J. Koenig
Tankcar S. M., Bruce Sullivan
Ser. Sta. S. M., Glenn Sullivan
Ch. Engr., C. F. Koenig
Ch. Chem., Glen R. Stephens
Pur. Agt. and Office Mgr., Dorothy Nowels
Supt., C. F. Koenig
Asst. Supt., A. Wandry
Refinery located at Thermopolis, Wyo.

Mohawk Petroleum Co., 405 Montgomery St., San Francisco, Calif.

Pres., Alfred L. Marsten
V.P., Edwin V. McKenzie
Sec. and Treas., M. E. Roof
Gen. Supt. Ref., J. A. Robinson
Pur. Agt., V. K. Douglas
Refinery located at Bakersfield, Calif.

Monarch Refining Co., Box 1283, Oklahoma City, Okla.

Corporation dissolved as of Jan. 1, 1937. Refinery in Oklahoma City now known as Crump Refinery.

Montgomery Co., Inc., H. A., 17191 Swift Ave., Detroit, Mich.

Pres., H. A. Montgomery
V. P.'s, W. Montgomery, J. W. Doyle, E. A. Nill, J. W. Laws, Jr.
Sec. and Treas., Francis Alexander
Gen. Mgr., H. A. Montgomery
Gen. Supt. Ref., B. B. Miller
Tankcar and Station S. M., James W. Laws, Jr.
Ch. Engr., R. P. Crothers
Ch. Chem., E. A. Nill
Pur. Agt., F. Alexander
Traf. Mgr., James W. Laws, Jr.
Supts., W. Montgomery, Detroit, Mich.: B. B. Miller, Findlay, Ohio; J. W. Doyle, Chicago, Ill.
Refineries located at Dyer, Ohio, Findlay, Ohio

Mooreroft Refining Co., Inc., Moorcroft, Wyo.

Pres. and Gen. Mgr., Earl M. Dorris
Sec., L. G. Dorris
Gen. Supt. Ref., F. E. Reichenberg
Refinery located at Moorcroft, Wyo.

Moutray Oil Co., Box 29, Abilene, Tex.

Pres., E. W. Moutray
V. P., C. B. Snyder, Moran, Tex.
Sec. and Treas., M. P. Moutray
Gen. Mgr., E. W. Moutray
Tankcar S. M., E. W. Moutray
Station S. M., L. Paul Kirk
Ch. Engr., L. G. Dufilho
Ch. Chem., O. L. Snyder, Hawley, Tex.
Supt., O. L. Snyder, Hawley, Tex.
Refinery located at Hawley, Tex.

Muenster Refining Co., Drawer G, Muenster, Tex.

Owner and Mgr., A. G. Hutton
Refinery located at Muenster, Tex.

N

Naph-Sol Refining Co., P.O. Box 307, Muskegon, Mich.

Pres., W. E. Anderson
V. P.'s, A. F. Hickey, J. F. Helms
Sec., A. W. Penny
Treas., C. S. Walkowiak
Gen. Mgr., W. E. Anderson
Gen. Supt. Ref., J. F. Helms
Tankcar S. M., A. F. Hickey
Service Station S. M., F. H. Emig
Ch. Engr., Edwin A. Clarke
Ch. Chem., J. T. Hodges, Jr.
Pur. Agt., W. E. Anderson
Traf. Mgr., J. A. Sundquist
Asst. Supt., Hal B. Burrell
Refinery located at Muskegon, Mich.

National Refining Co., Hanna Bldg., Cleveland, Ohio

Pres., W. H. Lamprecht, II.
V. P.'s, C. S. Smith, H. F. Heil
Sec., J. D. Sadler
Refineries located at Coffeyville, Kans.; Findlay and Marietta, Ohio.

Nortex Refining Co., New Castle, Tex.

Owners, Frank Hawkins and R. E. Caswell, Fort Worth, Tex.
Refinery located at New Castle, Tex.

North Texas Oil & Refining Co., Gainesville, Tex.

Owners, R. L. Knight and J. R. Sullivan
Refinery located at Gainesville, Tex.

Northwestern Petroleum (Formerly Northwestern Petroleum Co.), Box 467, Newcastle, Wyo.

Gen. Mgr., F. W. Palis
Refinery located at Osage, Wyo.

Northwest Refining Co., Cut Bank, Mont.

Pres., L. B. O'Neil
V. P.'s, G. N. McCabe, T. J. Landry
Sec. and Treas., V. R. Nelles
Gen. Supt. Ref., T. J. Landry
Ch. Engr., R. W. Wood
Refinery located at Cut Bank, Mont.

Norwalk Co., The, 634 S. Spring St., Los Angeles, Calif.

Pres., Lionel T. Barneson
V. P.'s, H. J. Barneson, J. L. Barneson
Sec., W. E. Kropp
Gen. Mgr., L. L. Aubert
Asst. to Gen. Mgr., H. M. Paulsen
Pur. Agt., John C. Penn
Supt., Jack Brennan, Box 688, Maricopa, Calif.
Refinery located at Maricopa, Calif.

O

Ocean Petroleum Corp., Kilgore, Tex.

Pres., C. F. Lacey
Supt., J. R. Robertson
Refinery located at Kilgore, Tex.

O. C. Field Gasoline Corp., 950 Wilshire Blvd., Los Angeles, Calif.; (Casmite Corporation)

Pres., O. C. Field
V. P.'s, W. G. Metson, J. C. Burks
Sec., Newton J. Hale
Treas., R. B. Hale
Gen. Supt. Ref., A. E. Ireland
Supt., A. C. Young, Casmalia, Calif.
Refinery located at Casmalia, Calif.

Ohio Oil Co., The, 539 S. Main St., Findlay, Ohio

Pres., O. D. Donnell
V. P.'s, C. L. Fleming, W. W. Fleming, John McFadyen
Sec., E. B. Redpath
Treas., F. A. Billstone
V. P. in Charge Ref. and Mar., C. L. Fleming
Gen. Supt. Ref., R. E. Luton
Tankcar S. M., N. T. Stover
Station S. M., C. L. Fleming
Ch. Chem., T. W. Culmer
Pur. Agt., C. S. Sherk
Traf. Mgr., E. W. Evans
Supts., H. E. Handy, Robinson, Ill.; J. R. Barrott, Fort Worth (Hodge), Tex.; D. L. Winsett, Bristow, Okla.
Refineries located at Robinson, Ill.; Bristow, Okla., and Fort Worth (Hodge), Tex.

Ohio Valley Refining Co.

(Now Quaker State Oil Refining Co.)

Oil Creek Refining Co., Titusville, Pa.

Pres., Frank J. McGraw
V. P., George L. Craft
Sec., George E. Ehrhart
Treas., M. D. Woods
Gen. Mgr., Frank J. McGraw
Supt. Ref., Frank Burow
Tankcar S. M., M. D. Woods
Station S. M., George E. Ehrhart
Ch. Engr., Daniel Beck
Ch. Chem., George L. Octon
Pur. Agt., George E. Ehrhart
Traf. Mgr., M. D. Woods
Refinery located at Titusville, Pa.

Old Dutch Refining Co., Muskegon, Mich.

Pres., John Borden
V. P., Justin H. Bender
Sec., F. H. Duggan
Treas., Justin H. Bender
Gen. Mgr., John Borden
Tankcar and Service Station S. M., H. E. Johnston
Gen. Supt. Ref., W. R. Newman
Ch. Engr., W. R. Newman
Ch. Chem., A. A. Vendetti
Traf. Mgr., John Dalson
Refinery located at Muskegon, Mich.

Olney Oil & Refining Co., P.O. Box 958, Wichita Falls, Tex.

Pres., Frank Kell
V.P., Joe A. Kell
Sec. and Treas., C. W. Cahoon, Jr.
Gen. Mgr., C. W. Cahoon, Jr.
Gen. Supt. of Ref., P. E. Slater, Olney, Tex.
Tankcar S. M., C. W. Cahoon, Jr.
Ch. Engr., P. E. Slater
Ch. Chem., J. P. Slater
Pur. Agt., P. E. Slater
Traf. Mgr., C. G. Stokes
Supt., P. E. Slater
Asst. Supt., J. P. Slater
Refinery located at Olney, Tex.

Olympic Refining Co., 2425 California Ave., Long Beach, Calif.

Refinery located at Long Beach, Calif.

Omar Refining Co., P.O. Box 169, Tulsa, Okla.

Pres., F. S. Whitaker
V.P., J. H. Whitaker
Sec. and Treas., M. H. Collins
Gen. Supt. Ref., O. D. Gurley, Garber, Okla.
Ch. Chem., Paul Williams, Garber, Okla.
Pur. Agt., O. D. Gurley, Garber, Okla.
Traf. Mgr., V. C. Gibson
Refinery located at Garber, Okla.

Onyx Refining Corp., Box 330, Abilene, Tex.

Pres., O. B. Stephens
V. P.'s, Ray D. McGlothlin, F. H. Murphy
Sec., J. B. Self
Treas. and Gen. Mgr., O. B. Stephens
Gen. Supt. Ref., Ray D. McGlothlin
Refinery located at Hawley, Tex.

Operators Oil & Refining Co., Long Beach, Calif.

Refinery located at Long Beach, Calif.

Oreana Refining Co., Box 21, La Barge, Wyo.

Pres., H. Riley
Gen. Mgr., Harold Riley
Gen. Supt. Ref., S. D. Grench
Refinery located at La Barge, Wyo.

Overton Refining Co., Box 27, Overton, Tex.

Pres. and Gen. Mgr., J. D. Wrather
V.P. and Treas., John Wrather
Sec., George C. Walters
Tankcar S. M., P. H. Hertzog
Refineries located at Overton and Kilgore, Tex.

P

Paluxy Asphalt Co., Talco, Tex.

Pres., Eugene Constantin
Supt., H. J. Toups
Refinery located at Talco, Tex.

Panama Refining Co., Kilgore, Tex.

Pres., A. Fanding
Sec., R. H. Canterbury
Refinery located at Kilgore, Tex.

Pan American Petroleum & Transport Co., 122 East Forty-second St., New York, N. Y.

Ch. of Bd., E. G. Seubert
Vice Ch., R. E. Wilson
V.P. and Asst to V. Ch., E. G. McKeever
Pres., Louis Blaustein
Exec. V.P., Jacob Blaustein
V.P. and Treas., J. A. Carroll, Jr.
V.P.'s, J. S. Wood, C. F. Hatmaker

Sec., D. H. Baker
Asst. Sec. and Asst. Treas., A. N. Penn
Gen. Mgr., D. J. Smith
Pur. Agt., J. A. Whitely
Traf. Mgr., J. S. Wood
Supts., H. T. Hulin, Savanah, Ga.; P. J. Sweeny, Texas City, Tex.; W. W. Hulin, Baltimore, Md.
Asst. Supts., H. J. Broderson, Texas City, Tex.; William Mellendick, Baltimore, Md.
Refineries located at Baltimore, Md.; Savannah, Ga.; Texas City, Tex.

Pan American Southern Corp., 122 East Forty-second St., New York, N. Y.

Pres., E. G. McKeever
V.P.'s, A. E. Ralston, J. A. Carroll, Jr.
Sec., D. H. Baker
Treas., J. A. Carroll, Jr.
Asst. Sec. and Asst. Treas., A. N. Penn
Gen. Mgr., D. J. Smith
Gen. Supt. Ref., D. J. Smith
Pur. Agt., J. A. Whitely
Traf. Mgr., J. S. Wood
Supt., F. W. Grey, Destrehan, La.
Refinery located at Destrehan, La.

Panhandle Refining Co., P.O. Box 1191, Wichita Falls, Tex.

Pres., Roy B. Jones
V. P.'s, M. A. Chambers, R. C. Stanford, G. W. Reed
Sec., H. F. Bennett
Treas., M. A. Chambers
Gen. Mgr., Roy B. Jones
Gen. Supt. Ref., W. F. Sims
Tankcar and Station S. M., G. W. Reed
Ch. Chem., E. W. Ellis
Pur. Agt., Roy J. Mann
Traf. Mgr., J. H. Davenport
Supts., G. D. Kinnard, Wichita Falls, Tex.; R. W. Jacobs, King's Mill, Tex.; J. C. Hester, Lueders, Tex.
Refineries located at Wichita Falls, Tex.; King's Mill, Tex., and Lueders, Tex.

Paraffine Companies, Inc., The, 475 Brannan St., San Francisco, Calif.

Chm. of Bd., R. S. Shainwald
Pres., W. H. Lowe
V.P. and Treas., R. H. Shainwald
Sec., R. Ohea
Gen. Supt. Ref., O. H. Robertson
Ch. Engr., J. T. Coleman
Ch. Chem., L. S. Read
Pur. Agt., A. H. Silverstone
Traf. Mgr., A. W. Brown
Refinery located at Emeryville, Calif.

Park Refining Co., Cody, Wyo.

Pres., V. M. Kirk
V. P., Carrol J. Kirk
Sec. and Treas., W. W. Lindsey
Gen. Mgr., V. M. Kirk
Gen. Supt. Ref., J. B. Kimes
Ch. Engr., J. H. Shepard
Ch. Chem., K. E. Dyer
Refinery located at Cody, Wyo.

Pecos Diamond Refining Co., Inc., Artesia, N. Mex.

Pres., G. A. Grober
V. P., I. M. Grober
Sec. and Treas., Henry W. Harriman
Ch. Engr. and Chem., Ed Millard
Refinery located at Artesia, N. Mex.

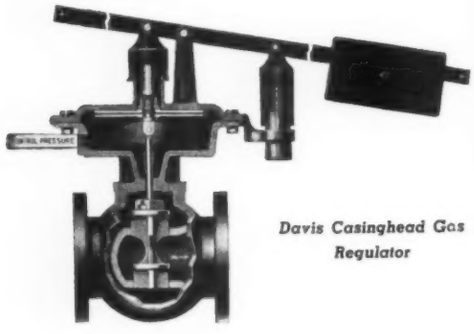
Peninsula Oil Co., The, Port Clinton, Ohio

Pres., C. W. Underwood
V.P., G. J. Becker
Sec. and Treas., R. S. Seufert
Gen. Mgr., C. W. Underwood
Pur. Agt., C. W. Underwood
Supt., S. D. LeCrane, Catawba Island, Ohio
Asst. Supt., Herb Sass, Catawba Island, Ohio
Refinery located at Catawba Island, Ottawa County, Ohio

Pennsylvania Oil Products Refining Co., Warren, Pa.

Pres., M. F. Cowden

No. 331



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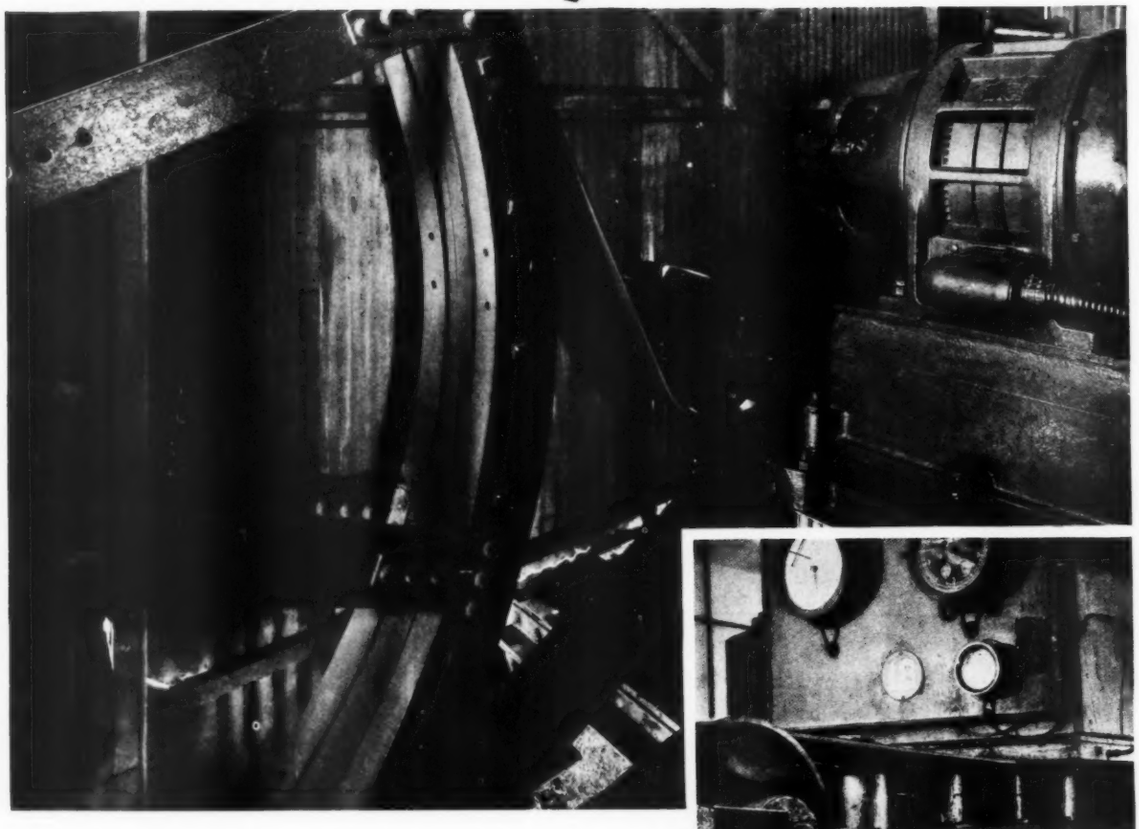

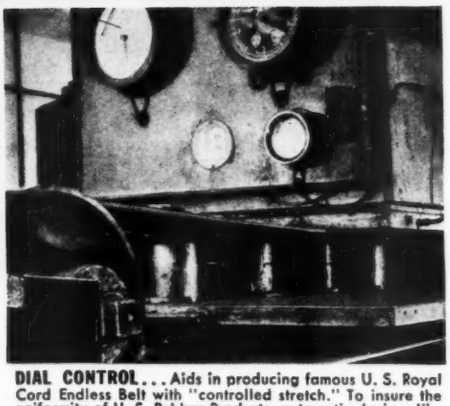

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Sta. S. M., J. A. Jackson
Ch. Chem., James L. Eisler
Traf. Mgr., W. W. Schoenfeld
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V. P.'s, W. S. Zehrung, J. F. Vandeventer
Sec., R. A. Browne
Treas., M. A. Brewster
Gen. Mgr., R. S. King
Gen. Supt. Ref., L. D. Fulton
Tankcar S. M., R. A. Browne
Service Sta. S. M., W. R. Birkmayr
Ch. Engr., P. M. Robinson
Ch. Chem., Dr. G. O. Ebrey
Pur. Agt., A. W. Clinger
Traf. Mgr., D. E. Carrier
Supt., L. D. Fulton
Asst. Supts., J. M. Hinman, Rouseville, Pa.: D. J. Harvey, Oil City, Pa.
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Peppers Gasoline Co., Box 86, Oklahoma City, Okla.

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Sec. and Treas., H. H. Champlin
Gen. Mgr., Charles C. Peppers
Gen. Supt. Ref., J. C. McConnico
Refinery located at Oklahoma City, Okla.

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V. P., Harold R. Pauley
Sec., James P. Fitzpatrick
Treas., Percy F. Cartzdafner
Gen. Supt. Ref., George E. Miller
Tankcar and Station S. M., W. A. Burns
Ch. Chem., R. Tarshis
Pur. Agt., John Sherrick
Traf. Mgr., A. S. Hovey
Asst. Supt., R. Kerr
Refinery located at Los Angeles, Calif.

Pettus Oil & Refining Co., Pettus, Tex.

Pres., Morris Roberts
V. P., W. D. Walton
Sec. and Treas., George A. Ray, Jr.
Gen. Mgr., Morris Roberts
Gen. Supt. Ref., J. F. Pollard
Tankcar S. M., S. R. Hunt
Station S. M., A. W. Lewis
Ch. Engr., J. F. Pollard
Ch. Chem., Roy W. Machen
Pur. Agt., Morris Roberts
Traf. Mgr., S. R. Hunt
Refinery located at Pettus, Tex.

Phillips Petroleum Co., Phillips Bldg., Bartlesville, Okla.

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V.P.'s, John H. Kane, William N. Davis, G. G. Oberfell, H. E. Koopman, C. P. Dimit, J. M. Sands, F. E. Rice, C. R. Musgrave, H. A. Trower, M. P. Youker, Don Emery
Sec., B. F. Stradley
Treas. and Asst. to Pres., K. S. Adams
V.P. in Chg. Ref., M. P. Youker
V.P. in Chg. Mkt. Dept., H. A. Trower
Gen. S. M., A. M. Hughes
Tankcar S. M., H. A. Gardner
Ch. Engr. Ref. Dept., William H. Creel
Pur. Agt., H. E. Koopman
V.P. in Chg. Traf. Dept., C. R. Musgrave
Traf. Mgr., E. C. Kitching
Supts., Hugh Miller, Borger, Tex.; J. W. Mitchell, Kansas City, Kans.: R. D. Evans, Okmulgee, Okla.
Asst. Supts., J. L. Farrell, Borger, Tex.; J. E. Bogk, Kansas City, Kans.
Refineries located at Borger, Tex.; Kansas City, Kans., and Okmulgee, Okla.

Phoenix Refining Co., Inc., Box 5055, Dallas, Tex.

Pres., R. R. Russel
Gen. Mgr., E. E. Wallace
Supt., J. F. Muense
Refineries located at Bruni and San Antonio, Tex.

Pilgrim, Inc., Ardmore, Okla.

Pres., Walter Neustadt
V. P., Max Westheimer
Sec. and Treas., D. W. Neustadt
Gen. Supt. Ref., M. Blakley
Refinery located at Kingston, Okla.

Pilot Butte Oil Co., Noble Hotel Bldg., Lander, Wyo.

Pres., H. Kenyon Burch
Gen. Mgr., Alfred Ellerby
Refinery located at Morton, Wyo.

Pioneer Oil & Refining Co., 604 Carolina St., San Antonio, Tex.

Pres., A. B. Slimp
Sec. and Treas., M. L. Roark
Gen. Mgr., A. B. Slimp
Gen. Supt. Ref., H. B. Slimp
Tankcar and Sta. S. M., F. A. Slimp
Ch. Engr. and Ch. Chem., A. I. Robertson
Pur. Agt., C. A. Slimp
Traf. Mgr., A. W. Nunn
Supt., H. B. Slimp, Somerset, Tex.
Asst. Supt., A. I. Robertson
Refinery located at Somerset, Tex.

Plainview Refining Co., Plainview, Tex.

Pres., J. C. Hooper
Sec. and Treas., O. D. Byrd
Gen. Mgr., E. M. Corah
Supt., L. A. Martin
Refinery located at Plainview, Tex.

Premier Oil Refining Co. of Texas, P. O. Box 1328, Longview, Tex.

Pres., Sylvester Dayson
V. P.'s, Sam W. Ross, R. A. Stacy
Sec. and Treas., Richard W. Blalock
Gen. Mgr., Sylvester Dayson
Ch. Chem., W. S. Cazort
Pur. Agt., R. P. Hargis
Refinery located at Willow Springs, Tex.

Producers Refining, Inc., West Branch, Mich.

Pres., Carl J. Westlund
V. P., E. L. Dalton
Sec., C. B. Mullinax
Treas., E. L. Dalton
Gen. Mgr., Carl J. Westlund
Gen. Supt. Ref., H. C. Smith
Refinery located at West Branch, Mich.

Pure Oil Co., The, 35 East Wacker Drive, Chicago, Ill.

Pres., Henry M. Dawes
V.P.'s, R. W. McIlvain, C. B. Watson, N. H. Weber, Rawleigh Warner, L. S. Wescoat
Sec., L. S. Wescoat
Treas., Rawleigh Warner
Gen. Supt. Ref., R. C. Osterstrom
Tankcar S. M., R. H. McElroy, Jr.
Service Station S. M., G. C. Morris
Ch. Engr., D. E. Sullivan
Ch. Chem., C. R. Wagner
Pur. Agt., G. L. Parsons
Traf. Mgr., Henry Hauseman
Supts., J. C. Megraw, Cabin Creek, W. Va.; E. E. McPherson, Heath, Ohio; E. A. McCadden, Marcus Hook, Pa.; K. B. May, Midland, Mich.; G. T. Yost, Muskogee, Okla.; R. L. Vernor, Smiths Bluff, Tex.; O. B. Wendeln, Toledo, Ohio.
Asst. Supts., D. P. Hankins, Cabin Creek, W. Va.; I. L. Hostetler, Heath, Ohio; J. J. Grace, Marcus Hook, Pa.; J. B. Price, Muskogee, Okla.; J. S. Allen, Smiths Bluff, Tex.; H. L. Smith, Toledo, Ohio
Refineries located at Cabin Creek, W. Va.; Heath, Ohio; Marcus Hook, Pa.; Midland, Mich.; Muskogee, Okla.; Smiths Bluff, Tex.; Toledo, Ohio.

Q

Quaker State Oil Refining Corp., Box 176, Oil City, Pa.

Pres., H. J. Crawford
V. P.'s, S. Messer, James D. Berry
Sec., W. R. Reitz
Treas., Charles D. Berry
Gen. Supt. Ref., G. B. Hunter
Pur. Agt., L. R. Forker
Supts., E. E. Ebner, Emlenton, Pa.: J. B. Northrop, St. Marys, W. Va.: H. E. Shoemaker, Oil City, Pa.: W. H. Rockman, Farmers Valley, Pa.
Refineries located at Emlenton, Pa.: St. Marys, W. Va.; Oil City, Pa.: Farmers Valley, Pa.

R

Rado Refining Co., McAllen, Tex.

Pres., Charles J. Holland
V. P., Ralph E. Fair
Sec. and Treas., J. L. Lobdell
Gen. Mgr., Charles J. Holland
Refinery located at McAllen, Tex.

Ralston Refinery, Upton, Wyo.

Owner, J. F. Ralston
Refinery located at Upton, Wyo.

Ranne Refining Co., P.O. Box 752, San Antonio, Tex.

Owner, R. Ranne
Gen. Supt. Ref., R. Ranne
Service Station S. M., F. L. Tolleson
Supts., F. L. Tolleson, San Antonio, Tex.; N. A. Dougles, Mathis, Tex.
Refineries located at San Antonio and Mathis, Tex.

Raven Oil & Refining Co., Rangely, Colo.

Pres., J. W. Leonard, Washington, Pa.
V. P., F. G. Cary, Lodi, Calif.
Sec., Treas. and Gen. Mgr., R. A. Bryson
Gen. Supt. Ref., M. M. Cook
Pur. Agt., R. A. Bryson
Refinery located at Rangely, Colo.

Red River Refining Co., 4323 S. Western Blvd., Chicago, Ill.

Pres., P. B. Flynn
V. P., J. P. Goodrich
Sec. and Treas., R. S. Watt
Pur. Agt., C. A. Harris
Traf. Mgr., J. E. Hayden
Supt., C. A. Harris, Burnham, Ill.
Asst. Supt., Albert Conrad, Burnham, Ill.
Refinery located at Burnham, Ill.

Refugio Refinery, The, 1204 Alamo National Bldg., San Antonio, Tex.

Pres., Garland Clymore
Sec., B. S. Fenlaw
Treas., R. C. Willett
Asst. Mgr., H. L. McQuiston
Gen. Supt. Ref., Ralph Wyrick
Ch. Engr., W. R. Hounsell
Ch. Chem., W. R. Hounsell
Refinery located at Refugio, Tex.

Republic Oil Refining Co., Benedum-Trees Bldg., Pittsburgh, Pa.

Pres., O. D. Robinson
V.P.'s, D. W. Hovey, J. M. Gardiner, W. E. Huston
Sec. and Treas., W. H. Moreland
Gen. Supt. Ref., C. E. Robertson
Sales Mgrs., D. W. Hovey, 609 Second National Bank Bldg., Houston, Tex., and J. M. Gardiner
Ch. Engr., L. Keller, Texas City, Tex.
Ch. Chem., D. M. Veale, Texas City, Tex.
Pur. Agt., D. W. Hovey
Traf. Mgr., L. B. Morgan, Houston, Tex.
Supt., C. E. Robertson, Texas City, Tex.
Asst. Supt., C. C. Evans, Texas City, Tex.
Refinery located at Texas City, Tex.

Resolute Oil Corp., Strain Bldg., Great Falls, Mont.

Pres., Julius C. Peters
V. P., W. R. Strain
Sec., Charles A. Harper
Treas., A. W. Strain
Field Supt., A. G. Peters
Ref. Supt., J. V. Vickery
Refinery located at Badger Basin, Wyo.

Rex Oil Refinery, Inc., Rapid City, S. Dak.

Pres., Elmer Ratcliff
V. P., C. F. Clark
Sec. and Treas., Gail M. Lewis
Gen. Mgr., Gail M. Lewis
Gen. Supt. Ref., Elmer Ratcliff
Ch. Engr., Elmer Ratcliff
Ch. Chem., C. F. Clark
Pur. Agt., Gail M. Lewis
Refinery located at Rapid City, S. Dak.

Rice Ranch Oil Co., 124 West 4th St., Los Angeles, Calif.

Pres., J. C. Netz
V. P.'s, Emil Kirchner, F. H. Powell
Sec., I. M. Hine
Gen. Mgr., J. C. Netz
Supt., George Holmes, Santa Maria, Calif.
Asst. Supt., B. Billington, Santa Maria, Calif.
Refinery located at Santa Maria, Calif.

Richfield Oil Co. of California, 555 S. Flower St., Los Angeles, Calif.

Reorganization Trustee, William C. McDuffie
Ref. Mgr., A. M. Kelley
Tankcar and Sta. S. M., R. W. Walsh
Ch. Engr., D. E. Day
Ch. Chem., R. K. Hewes
Pur. Agt., B. J. Mahaffy
Traf. Mgr., W. O. Narry
Gen. Supt., R. A. Panero
Refineries located at Watson, Hynes, Bakersfield and Los Angeles, Calif.

Rio Grande Oil Co., 417 S. Hill St., Los Angeles, Calif.

(Controlled by Consolidated Oil Corp.)
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V.P.'s, H. E. Britzman, Frank A. Morgan
Sec. and Treas., M. R. Gross
Gen. Mgr., C. S. Jones
Gen. Supt., J. J. Downey
Dir. of Sales, H. E. Britzman
Gen. Sales Mgr., A. H. Harris
Ch. Chem., M. Bach
Pur. Agt., H. H. Kelly
Traf. Mgr., A. L. Sarrels
Supt., William Murray, Vinvale, Calif.
Refinery located at Vinvale, Calif.

Rio Refining Co., Sullivan City, Tex.

Owner, A. R. Thomas
Refinery located at Sullivan City, Tex.

Rock Island Refining Co., Box 671, Duncan, Okla.

Pres., L. B. Simmons
V. P.'s, L. E. Kincannon, H. B. Alspaugh, O. W. Simmons
Sec. and Treas., W. Witt
Gen. Mgr., L. B. Simmons
Gen. Supt. Ref., A. L. Rayburn
Tankcar S. M., H. C. Allen
Ch. Chem., Hugh A. Neal
Pur. Agt., R. H. Roper
Traf. Mgr., R. H. Roper
Asst. Supts., A. R. Love, R. C. Underwood, Beckett, Okla.
Refinery located at Beckett, Okla.

Rodessa Oil & Refining Corp., Box 38, Shreveport, La.

Pres., M. J. Grogan
V.P. and Gen. Mgr., B. P. Crittenden
Sec. and Treas., J. E. Marshall
Gen. Supt. of Ref., H. D. McLean, Cedar Grove, La.
Tankcar and Sta. S. M., W. F. Kostelka

Ch. Engr., H. D. McLean
Ch. Chem., J. R. Cox
Pur. Agt., O. F. Shaver
Traf. Mgr., C. C. Correll
Refinery located at Cedar Grove, La.

Roosevelt Oil Co., Mount Pleasant, Mich.

Pres., C. L. Maguire
V.P.'s, T. F. Caldwell, W. L. Davis
Sec. and Treas., S. M. Fasquelle
Asst. Treas., E. Allen Morrow
Gen. Supt. Ref., E. R. Hively
Tankcar and Station S. M., H. E. Bangert
Ch. Chem., George F. Chase
Pur. Agt., L. J. Thompson
Traf. Mgr., B. E. Kothe
Supt., E. R. Hively
Asst. Supt., W. B. Howard, Jr.
Refinery located at Mount Pleasant, Mich.

Root Petroleum Co., Box 1123, Shreveport, La.

Pres., D. P. Hamilton
V. P., H. Canon
Sec., T. E. Beaird
Treas., L. C. Hallonquist
Gen. Mgr., D. P. Hamilton
Gen. Supt. Ref., Ed Kimes
Tankcar S. M., D. A. Brown
Ch. Engr., R. T. Colquette
Ch. Chem., T. L. McNamara
Pur. Agt., T. E. Beaird
Traf. Mgr., R. L. Aycock
Asst. Supt., John Brown, El Dorado, Ark.
Refinery located at El Dorado, Ark.

Rothschild Oil Co., Santa Fe Springs, Calif.

Pres., W. J. Rothschild
Refinery located at Santa Fe Springs, Calif.

Rusk Oil & Refining Co., Box 270, Tyler, Tex.

Pres., H. H. Coffield
V. P., George P. Mann
Sec. and Treas., J. H. Edwards
Gen. Supt. Ref., George P. Mann
Tankcar S. M., J. H. Edwards
Refinery located at Overton, Tex.

Russell Oil Co., 642 Utah Ave., Butte, Mont.

Pres., Mrs. Joseph Russell
Sec., L. Renland
Treas., Mrs. Joseph Russell
Gen. Mgr., Fred S. Woodhull
Refineries located at Billings and Butte, Mont.
Note: Refineries leased to Independent Sales Co., Billings, Mont.

Russell Producing Co., The, 1205 Union Trust Bldg., Cincinnati, Ohio

Pres., John J. Rowe
V.P.'s, W. R. Foulkes, Charles W. Finch
Sec. and Treas., Frank H. Blum
Gen. Supt. Oper., R. L. Mong, Sunbright, Tenn.
Refinery located at Sunbright, Tenn.

Russell Refining Co., Box 634, Russell, Kans.

Pres., Charles Lischesky
Sec. and Treas., Robert Sohlberg
Gen. Mgr., J. J. Van der Voort
Tankcar S. M., H. N. Whitaker
Refinery located at Russell, Kans.

S

Sageland Refining Co., Sweetwater, Tex.

Pres., Ernest Wright
V. P., W. H. Whaley
Sec. and Treas., D. G. Beall
Refinery located at Sweetwater, Tex.

Salt Creek Refining Co., 112 S. Center St., Casper, Wyo.

Pres., A. E. Winter
V.P., C. R. Cantrell
Sec., Treas. and Gen. Mgr., Thomas C. Speors
Gen. Supt. Ref., Dave Gillespie
Refinery located at Columbine, Wyo.

San Antonio Refining Co., Southton, Tex.

Partnership, Dr. J. S. Swearinger and Otto Gerbes
Refinery located at Southton, Tex.

San Fernando Refining Co., Box 310, San Fernando, Calif.

Gen. Mgr., J. O. Moffett
Gen. Supt. Ref., William D. Parks
Service Station S. M., J. O. Moffett
Pur. Agt., E. A. Ericson
Asst. Supt., L. G. Haworth, Newhall, Calif.
Refinery located at Newhall, Calif.

Seaside Oil Co., Summerland, Calif.

Pres., J. F. Bushnell
V. P., H. B. Kellogg
Sec. and Treas., M. W. O'Brien
Gen. Mgr., J. F. Bushnell
Gen. Supt. Ref., D. C. Peet
Tankcar S. M., J. F. Bushnell
Service Sta. S. M., Winslow Bushnell
Pur. Agt., E. H. Beresford
Asst. Supt., Frank Fuller, Ventura, Calif.
Refineries located at Ventura and Summerland, Calif.

Shaffer Refining Co., Hutchinson, Kans.

Pres., E. R. Shaffer
V. P., A. M. Ballard
Sec., Cal Calloway
Refinery located at Hutchinson, Kans.

Shallow Water Refining Co., Scott City, Kans.

Pres., Morten Brown
V. P., M. E. White
Sec., D. M. Dryden
Treas., J. B. Allison
Tankcar and Service Sta. S. M., D. M. Dryden
Refinery located at Scott City, Kans.

Shamrock Oil & Gas Corp., The, Amarillo Bldg., Amarillo, Tex.

Pres., John J. Sheerin
V.P.'s, H. C. Fownes, II, Robert T. Wilson
Sec., J. B. Orr
Treas., H. C. Fownes, II
Gen. Mgr., Roland B. Day
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Tankcar S. M., N. E. Schneider
Ch. Chem., C. E. Gregg
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Asst. Supts., John Lynch, Sunray, Tex.; H. H. Heeren, Lefors, Tex.
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The use of HYDRAUGER in laying pipe under pavements avoids traffic interruption and damage to pavements. It bores straight, quickly, and with least possible expense.

The latest type Model 2A-2X is easier to handle and much faster than previous models. It is driven by 5 h.p. airmotor—bores holes from 2½" to 14½"—has hi-tensile bar joints and easy-to-handle 4'-8" bar sections. Its new style cutters bore faster and straighter. The shorter frame facilitates setting up. Write for full details about the new 2A-2X.

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NEW HIGH POWERED MODEL 2A-2X

HYDRAUGER
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That same carefully charted course that began with Layne & Bowler, Inc., in 1883, is today the guiding factor with "The World's Largest Water Developers." Why not take advantage of this widely experienced and internationally recognized water developing organization for the solving of your water production problems?

Oil Refinery executives whose 1937 plans call for more water, should call in a Layne hydrological engineer. No obligation. For illustrated literature, write Layne & Bowler, Inc., Dept. O, Memphis, Tenn.

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(Continued on Page 166)

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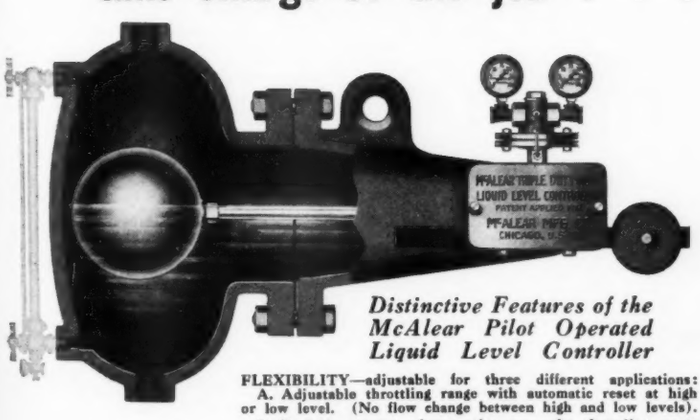
when McALEAR Controls take charge of the job . . .



Distinctive Features of the McAlear Pilot Operated Liquid Level Controller

FLEXIBILITY—adjustable for three different applications:
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THEY know that their big problem, a uniform product . . . hour by hour, day-in and day-out . . . is being solved for them, AUTOMATICALLY. Take for instance the problem of maintaining proper vapor tension. It becomes simple if a McAlear Triple Duty Pilot Liquid Level Controller is installed on the stabilizer and debutanizer to insure even temperature and flow regardless of surges in the level.

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AUTOMATIC CONTROLS for Pressure, Temperature, Liquid Level and Flow.

NEW REFINING PROCESSES EM

Users of Modern Vapor Saving Equipment Get Mounting Dividends

PIONEERING pays! And nowhere so much as in the oil industry. This fact is now being emphasized with increasing frequency as one after another organization cashes in on developments and improvements instigated by someone's foresight.

Not the least fortunate among these are the companies that have made thorough use of evaporation prevention equipment such as Wiggins Pontoon Roofs, Wiggins Breather Roofs, Hortonspheres, etc. Due to technological advances in utilization of volatile gases, many installations of these units show steadily mounting dividends being paid long after the original cost of the equipment has been refunded.

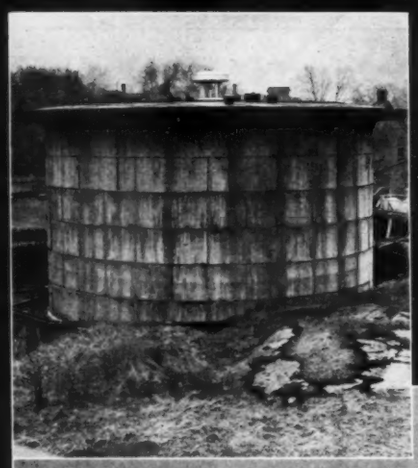
One startling example of the profits

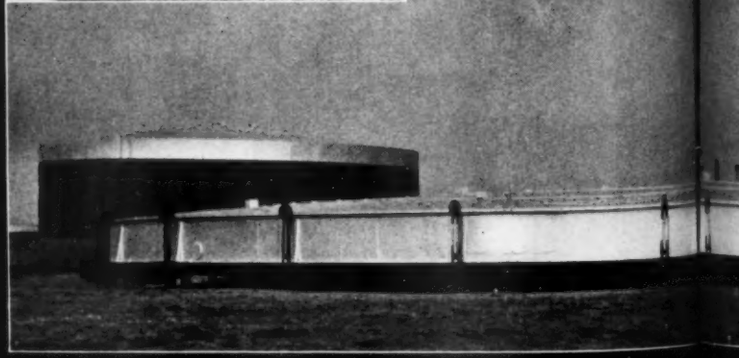
The Wiggins Pontoon Roof

This roof floats directly on the surface of the liquid in a tank at all levels. Vapor space inside the tank is eliminated and breathing and filling losses are thereby prevented. Recommended for all working tanks containing crude oil or gasoline. Also widely used for blending tanks. Because it eliminates conditions which might permit inflammable air-vapor mixtures to form, this roof greatly reduces fire hazard.

The Wiggins Ba

Wiggins Balloon units have found a wide field of application as central gasholders for modern vapor saving systems formed by interconnecting the vapor spaces of groups of gas tight tanks. The lower picture shows the large double-diaphragm type which is recommended for installations requir-





The Wiggins Breather Roof

Being in effect a flexible steel diaphragm providing a vapor space with variable volume, this roof is recommended to stop standing storage loss from tanks that normally remain full or nearly full of crude oil or motor gasoline for considerable periods of time. Where there is doubt that a tank will be kept filled regularly, use of the Wiggins Balloon Roof, illustrated at the right, may be preferred.

CHICAGO BRIDGE & IRON COMPANY

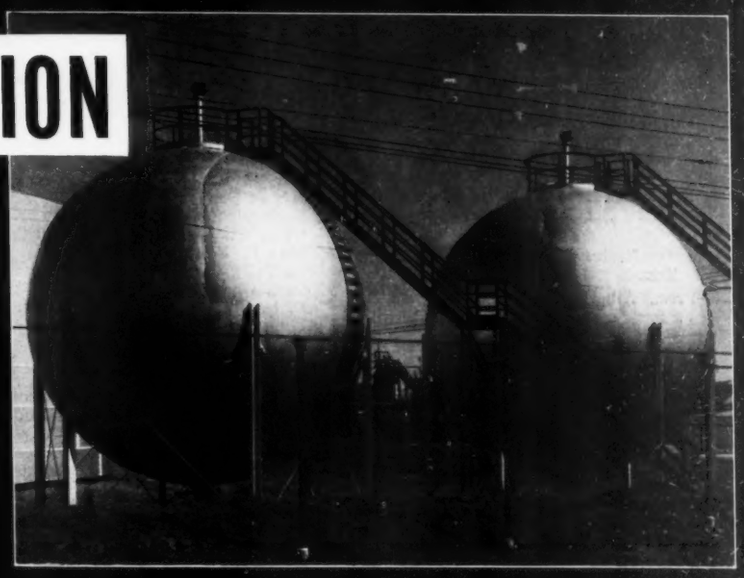
Fabricating Plants in BIRMINGHAM, CHICAGO and GREENVILLE, PA.

ES EMPHASIZE CONSERVATION

to be gained by preventing evaporation loss has recently been given wide publicity in connection with new polymerization processes. This was an authoritative estimate that 1,000,000,000 gallons of polymer gasoline could be made each year from the vapor that formerly wasted from crude oil left to "weather" in ordinary field storage tanks.

★ ★ ★

It is not too late to be a "pioneer". Start now and make sure that you are taking complete advantage of the opportunities offered by the equipment illustrated here. It is inevitable that waste of vapor will become increasingly expensive with each new development in the utilization of oil products. Our engineers will be glad to give recommendations. Address our nearest office.



The Hortonsphere

Recommended for the storage of volatile products at pressures of 25 to 100 lb. per sq. in. or higher. Eliminates venting during standing storage thus preventing evaporation losses due to breathing and boiling. Also reduces filling losses by the recondensing of vapor during filling. Because the entire exterior surface is above ground where it is accessible for inspection and painting, Hortonspheres have long life with minimum maintenance expense.

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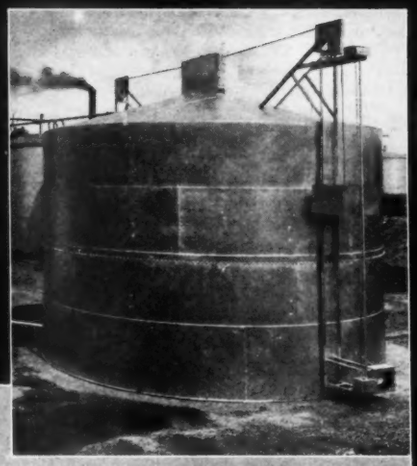
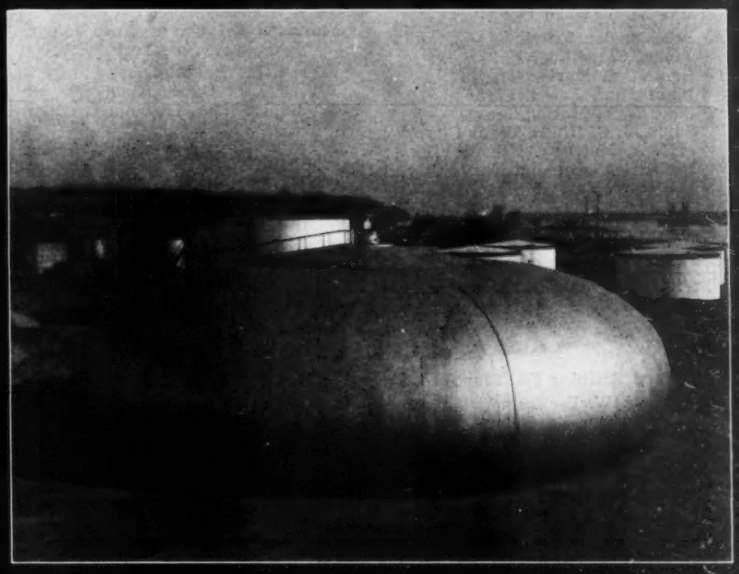
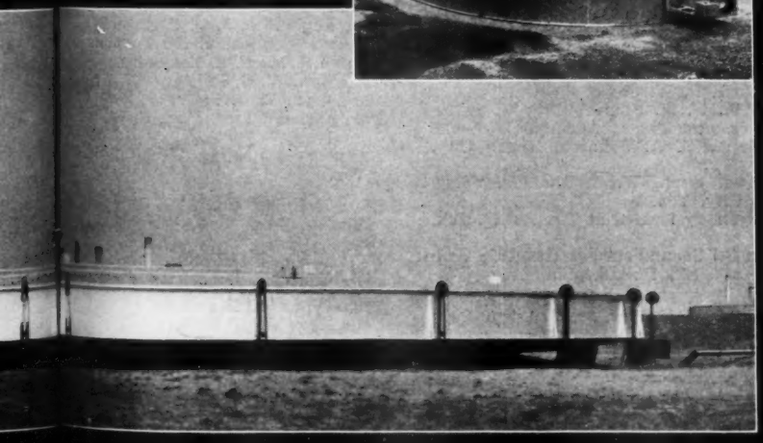
Balloon

ing vapor storage capacity of 20,000 cu. ft. or more. Below this capacity, the piston type Balloon shown at the right is recommended. The inset at the left shows the Wiggins Balloon Roof, which can also be connected to other tanks in addition to the one on which it is mounted.







The Hortonspheroid

Widely used for storage of natural gasoline at pressures up to 25 lb. per sq. in. Also built in large sizes for storage of modern high test motor fuels at low and medium pressures. Unique design results in most favorable balance of economy with capacity. It prevents breathing and boiling losses by eliminating venting during standing storage and reduces or eliminates filling losses depending on volatility of stored product and setting of relief valve.

Y

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(Continued from Page 163)

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Pur. Agt., W. C. Etzbach
Traf. Mgr., H. L. McReynolds
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Tankcar and Station S. M., Earl R. Tate
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Plant Mgr., Lee LeFerney
Sales Mgr., Marion Travis
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Sec. and Treas., F. J. Keleher
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Tankcar S. M., F. J. Keleher
Pur. Agt., W. L. James
Traf. Mgr., F. J. Keleher
Supt., O. W. White, Superior, La.
Asst. Supt., James Means, Superior, La.
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Sec., J. H. Tuttle
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Traf. Mgr., A. R. Slingerland
Sales Mgr., H. B. Fairchild
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Service Sta. S. M., J. E. Skehan
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Traf. Mgr., Harry Graham
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Mgr. of Ref., Chester F. Smith
Asst. Mgr. of Ref., J. R. Carringer
Tankcar and Service Sta. S. M., R. T. Haslam
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Ch. Chem., H. G. Burks, Jr.
Pur. Agt., J. W. Casterton
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Supts., E. A. Brown No. 1 Works, Cleveland; L. B. Helm, No. 2 Works, Cleveland; J. B. Middleton, Toledo; J. R. Cuthbert, Lima; A. H. Buchanan, Latonia, Ky.
Asst. Supts., C. H. Metz, No. 1 Works, Cleveland; R. H. Laird, No. 2 Works, Cleveland; Cal Brown, Toledo; M. G. Ball, Lima; Forrest Brown, Latonia, Ky.
Refineries, No. 1 Works, Cleveland, Ohio; No. 2 Works, Cleveland, Ohio; Toledo, Ohio; Lima, Ohio; Latonia, Ky.

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V.P.'s, W. H. Berg, R. W. Hanna, G. E. Kennedy, M. E. Lombardi, R. K. Davies
Sec., J. H. Tuttle
Treas., V. F. Palmer
Refinery located at El Paso, Tex.

Starlight Refining Co., Inc., Box "S" Ballinger, Tex.

Pres., Art Tucker
V. P. and Gen. Mgr., Geo. A. Sonricker
Sec., Roy Duke
Refinery located at Ballinger, Tex.

Starlight Refining Co., Box 154, Karns City, Pa.

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Gen. Supt. Ref., Clyde E. Pickard
Tankcar S. M., F. J. Pickard
Ch. Engr., Clyde E. Pickard
Ch. Chem., Richard Thompson
Pur. Agt., F. J. Pickard
Traf. Mgr., F. J. Pickard
Refinery located at Karns City, Pa.

Stephens Refining Co., Stephens, Ark.

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Gen. Mgr., R. H. Hassett
Supt., H. M. Gilbert
Refinery located at Stephens, Ark.

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L. A. Sec., A. P. McEachern
Gen. Supt. of Ref., C. Z. Webb
Tankcar and Sta. S. M., M. F. Dolan
Ch. Engr., C. Z. Webb
Ch. Chem., C. W. Spark
Pur. Agt., H. C. Drader
Traf. Mgr., R. M. Kennett
Asst. Supt., C. W. Spark, Pico, Calif.
Refinery located at Pico, Calif.

Stockton Oil Co., Inc., 405 Montgomery St., San Francisco, Calif.

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Sec., E. H. Orr
Treas., G. H. Crose, Jr.
Refinery located at Rough & Ready Island, Stockton, Calif.

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Sec. and Treas., William A. Stoll
Gen. Supt. Ref., J. W. Kittner
Tankcar S. M., J. J. Kirchner
Station S. M., Chas. E. Stoll
Ch. Chem., Clem S. Luce
Pur. Agt., John T. Crowdus
Traf. Mgr., Geo. E. Gill
Supt., J. W. Kittner
Asst. Supt., Geo. Kittner
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V.P., H. M. Stone
Sec. and Treas., Adelaide LaCombe
Supt., E. A. Johnson, Texas City, Tex.
Asst. Supt., W. A. Maddox, Texas City, Tex.
Refinery located at Texas City, Tex.

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Tankcar S. M., E. B. Eckert
Ch. Chem., Dr. Gellert Alleman
Supts., W. D. Mason, Marcus Hook, Pa.; H. O. Cameron, Toledo, Ohio; C. B. Carter, Yale, Okla.
Refineries located at Marcus Hook, Pa.; Toledo, Ohio.; Yale, Okla.

Sunray Oil Co., Philtower Bldg., Tulsa, Okla.

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Sec., W. D. Forster
Treas.. L. W. Bennett
Gen. Mgr., C. H. Wright
Gen. Mgr. Ref., F. L. Martin
Tankcar S. M., F. L. Martin
Station S. M., F. A. Gallo
Ch. Chem., Dale Fischbeck
Pur. Agt., R. E. Campbell
Traf. Mgr., J. B. Fairfield
Supt., R. L. Johnson, Allen, Okla.
Asst. Supt., A. D. Vinson, Allen, Okla.
Refinery located at Allen, Okla.

Super Asphalt Products Co., Long Beach Calif.

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Gen. Mgr., W. H. Geis
Refinery located at Long Beach, Calif.

Superior Oil Works, P.O. Box 56, Warren, Pa.

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Sec., Herbert G. Eaton
Treas., W. F. Clinger
Gen. Mgr., Owen E. McLeieer
Gen. Supt. Ref., Herbert G. Eaton
Tankcar S. M., Owen E. McLeieer
Ch. Chem., Raymond B. Allmendinger
Pur. Agt., Charles H. Eaton
Traf. Mgr., Charles H. Eaton
Asst. Supt., Raymond B. Allmendinger
Refinery located at Warren, Pa.

Sweet Oil Refining Co., Wyman, Mich.

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V.P., Max Pray
Sec. and Treas., H. T. Watson
Gen. Mgr., Max Pray
Gen. Supt. Ref., Frank McCormick
Tankcar and Service Station S. M., Max Pray
Ch. Chem., Lloyd Tonkin
Pur. Agt., Riley Tift
Traf. Mgr., Lloyd Wheeler
Refinery located at Wyman, Mich.

T

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Supt. of Ref., C. O. Garbrecht
Maintenance Engr., J. C. Reed
Ch. Chem., J. M. Dom
Auditor, Joe Dranguet
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V. P., Sec. and Treas., Maynard Taxman
Gen. Supt. Ref., J. E. Cochran
Tankcar S. M., Maynard Taxman
Station S. M., E. S. Taxman
Ch. Engr., W. G. Palmer
Ch. Chem., V. U. Cloer
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Gen. Supt. Ref., G. L. Rowsey
Tankcar S. M., Ben H. Harrison
Pur. Agt., Ben H. Harrison
Traf. Mgr., Ben H. Harrison
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Pur. Agt., D. L. Kelly
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Asst. Supt., Roy E Wood, Burkburnett, Tex.
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Refinery located at Anarene, Tex.

U

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Traf. Mgr., R. E. Brasington
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Supts., Ed Styren, Kalispell, Mont.; Roy Sticka, Havre, Mont.
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Sec. and Treas., A. N. Johnson
Gen. Supt. of Ref., Edward S. Holt
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Ch. Engr., Robert G. Clark
Ch. Chem., Gordon I. Kirby
Pur. Agt., Keros H. Searle
Traf. Mgr., John D. Campbell
Supt., Edward S. Holt
Asst. Supt., Frank R. Clark
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Refinery located at Virgin, Utah

V

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Tankcar and Service Station S. M., A. B. White
Gen. Supt. Ref., C. R. McGinnis
Ch. Chem., C. R. McGinnis
Pur. Agt., A. B. White
Asst. Supt., Eddie Day
Refinery located at Harlingen, Tex.

Valley Refining Co., P. O. Box 660, Roswell, N. Mex.

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Traf. Mgr., H. G. Shaw
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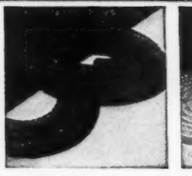

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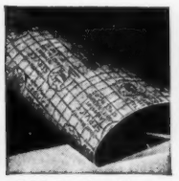

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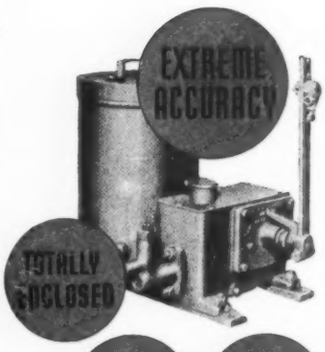

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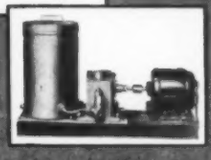

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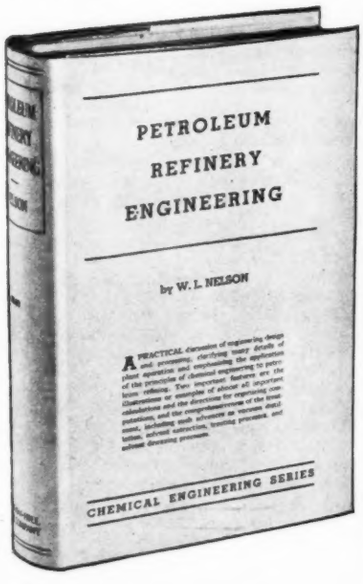

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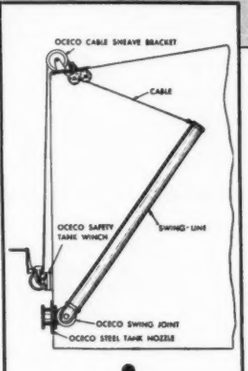

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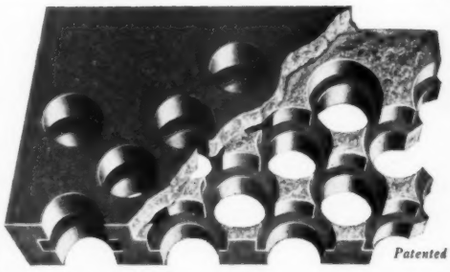

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Refineries Operating in the United States

Explanation of Terms Used in Operating Survey

(Comp.)—Complete plant, gasoline, kerosene, gas oil, fuel oil, lubricating oils, paraffin, wax, petroleum coke, asphalt or both coke and asphalt, usually includes cracking. Some plants listed as complete do not manufacture asphalt or coke.

(S)—Gasoline, kerosene distillate, gas oil and fuel oil.

(L)—Gasoline, kerosene distillate, gas oil, fuel oil, and lubricating oils.

(A)—Gasoline, kerosene distillate, gas oil, fuel oil and asphalt.

(T)—Tops, distillate, gas oil and fuel oil.

(C)—Same products as skimming, except equipped for cracking.

(W)—Wax.

Where plant includes cracking, lubricating oil and asphalt, (S) is omitted as skimming is implied.

(Crude Cap.)—Maximum number of barrels of crude plant is able to process daily.

(Gasoline Cap.)—Maximum number of barrels of gasoline the plant is able to make daily, including natural gasoline needed in blend.

ALABAMA

Company and plant location—	Crude oil cap.	Cracking cap.	Type of refinery	Type of cracking plant
Coastal Pet. Corp., Mobile	4,000	.....	S	

ARKANSAS

Berry Asphalt Co., Waterloo	2,000	.....	L-A	
Bright Stock Co., El Dorado	1,000	.....	L	
Cross Co., Henry H., Smackover	6,000	1,500	C-L	Donnelly
Lion Oil Ref. Co., El Dorado	13,000	4,500	C-L-A	Lion
Macmillan Pet. Corp., Norphlet	2,500	.....	Comp.	
Root Pet. Co., El Dorado	12,000	3,000	Comp.	Dubbs, Root
Stephens Ref. Co., Stephens	700	.....	S	
Total	37,200	9,000		

CALIFORNIA

Ajax Oil & Ref. Co., Clearwater	3,000	.....	S	
B. & T. Ref. Co., Hynes	1,000	.....	S	
Bush Oil Co., R. R., Long Beach	4,000	.....	S	
Bachmann Pet. Corp., Long Beach	5,000	.....	S	
Caminol Co., Ltd., Santa Fe Springs	3,500	.....		
Caminol Co., Ltd., Hanford	3,000	.....		
Caminol Co., Ltd., Venice	2,000	.....		
Capitol Crude Oil Co. of Los Angeles, Santa Paula	160	.....	S	
Eagle Oil & Ref. Co., Santa Fe Springs	1,000	.....	S	
Edington Oil & Ref. Co., Ltd., Signal Hill	4,500	.....	S	
Envoy Pet. Co., Long Beach	3,500	.....	S	
Elm Oil Co., Ltd., Long Beach	1,800	.....	S	
El Tejon Ref. Co., Mountain View	3,500	.....	S	
Estado Pet. Corp., Ltd., Long Beach	6,000	.....	S	
Exeter Ref. Co., Long Beach	10,000	.....	L-A	
Field Gasoline Corp., O. C., Casmalia	3,000	.....	A	
General Pet. Corp. of Calif., Vernon	28,000	.....	Comp.	
General Pet. Corp. of Calif., Torrance	35,000	6,000	S	Kellogg
General Pet. Corp. of Calif., Lebec	12,000	.....	S	
Gilmore Oil Co., Los Angeles	2,500	.....	S-A	
Gilmore Oil Co., Roadamite	1,700	.....	S-A	
Golden Bear Oil Co., Ltd., Oildale	500	.....	L	
Hancock Oil Co., Long Beach	15,000	5,000	S-C	Own
Harbor Ref. Co., Inc., Long Beach	2,500	.....	S	
Kolingo Ref. Co., Coalinga	300	.....	L	
Lake View Oil & Ref. Co., Maricopa	3,000	.....	S	
McCallen, M. M., Ref. Co., Huntington Beach	1,500	.....	S-A	
Macmillan Pet. Corp., Signal Hill	7,500	.....	S	
Mercury Pet. Corp., Venice	3,000	700	A	
Mohawk Pet. Co., Bakersfield	10,000	6,500	C-A	Own
Norwalk Co., The, Maricopa	4,000	.....	S	
Olympic Ref. Co., Long Beach	6,500	.....	S	
Operators Oil & Ref. Co., Long Beach	1,200	.....	S	
Paraffine Co., Inc., Emeryville	1,200	.....	A	
Petrol Corp., Los Angeles	6,500	.....	S-A	
Richfield Oil Co., Watson	40,000	16,000	Comp.	Black
Richfield Oil Co., Hynes	55,000	14,000	S-C	Cross
Rio Grande Oil Co., Vindale	10,000	3,000	S-C	Own
Rothschild Oil Co., Santa Fe Springs	2,500	.....	S	
San Fernando Ref. Co., Newhall	2,500	.....	S-A	
Seaside Oil Co., Ventura	4,500	.....	S-A	
Seaside Oil Co., Summerland	500	.....	S-A	
Shell Oil Co., Martinez	36,500	22,700	Comp.	Dubbs
Shell Oil Co., Wilmington	40,000	18,400	Comp.	Dubbs

CALIFORNIA (Continued)

Company and plant location—	Crude oil cap.	Cracking cap.	Type of refinery	Type of cracking plant
Shell Oil Co., Dominguez	.....	34,600	C	Dubbs
Shell Oil Co., Coalinga	3,900	.....	S	
Socal Oil & Ref. Co., Huntington Beach	3,000	.....	S	
St. Helens Pet. Co., Ltd., Pico	4,000	.....	S	
Standard Oil Co. of Calif., El Segundo	100,000	80,100	Comp.	Dubbs
Standard Oil Co. of Calif., Richmond	100,000	40,900	Comp.	Dubbs
Standard Oil Co. of Calif., Seguro	25,000	.....	S-A	
Super Asphalt Prod. Co., Long Beach	500	.....	A	
Texas Co., Los Angeles	35,000	9,000	C	Holmes-Manley
Texas Co., Fillmore	4,000	3,000	C	Cross
Tide Water Associated Oil Co., Avon	48,000	21,000	Comp.	Tube and Tank
Tide Water Associated Oil Co., Wilmington	10,000	7,500	S	Tube and Tank
Triangle Oil & Ref. Co., Venice	3,000	.....	S	
Union Oil Co. of Calif., Wilmington	53,000	13,200	S-C-V	Cross
Union Oil Co. of Calif., Oleum	17,000	.....	S-L-A	
Union Oil Co. of Calif., Bakersfield	5,000	.....	S	
Union Oil Co. of Calif., Santa Paula	1,200	.....	S	
Wilshire Oil Co., Inc., Los Angeles	20,000	.....	S	
Wilshire Oil Co., Inc., Norwalk	12,000	8,000	S-C	Dubbs
Wolfe Griffith Ref. Co., Long Beach	3,000	.....	S-L	
Total	832,960	305,100		

COLORADO

Bay Pet. Corp., Denver	2,000	*900	S-C-L	Dubbs
Berthoud Refinery, Berthoud	100	.....	S	
Continental Oil Co., Denver	1,850	1,000	S-C	Cross
Denver Ref. Syndicate, Denver	750	.....	S	
Raven Oil & Ref. Co., Rangely	200	.....	S	
Star Ref. Co., Fort Morgan	100	.....	S	
Texas Co., Craig	1,200	1,200	C	Holmes-Manley
Total	6,200	3,100		

*Under construction.

DELAWARE

Texas Co., Claymont	3,500	.....	A	

GEORGIA

Pan American Ref. Corp., Savannah	4,000	.....	A	

ILLINOIS

Calumet Ref. Co., Burnham	1,200	.....	L	
Cross Co., Henry H., Colmar	1,000	.....	S	
Cross Co., Henry H., Dupo	1,000	.....	S	
Cross Co., Henry H., Joliet	2,000	.....	S	
Globe Oil & Ref. Co., Lemont	16,000	8,000	S-C	Winkler-Koch
Indian Ref. Co., Lawrenceville	16,000	8,000	Comp.	Cross, deFlorez
Ohio Oil Co., Robinson	10,000	12,000	Comp.	Holmes-Manley
Red River Ref. Co., Burnham	1,000	.....	L	
Shell Pet. Co., Wood River	43,000	29,500	Comp.	Dubbs, T.V.P., Cross
Socony-Vacuum Oil Co., Inc. (Lubrite), East St. Louis	6,000	4,600	S-C	Pratt Vapor Phase
Standard Oil Co. (Ind.), Wood River	20,100	18,000	Comp.	Holmes-Manley
Texas Co., Lockport	20,000	18,100	Comp.	Holmes-Manley, deFlorez, Pressure Coke
Total	137,300	98,200		

INDIANA

Empire Oil & Ref. Co., East Chicago	25,000	15,000	S-C	Doherty
Shell Pet. Corp., East Chicago	30,000	21,000	S-C	Dubbs
Sinclair Ref. Co., East Chicago	40,000	28,500	C-L-W	Sinclair 600
Standard Oil Co. (Ind.), Whiting	103,000	86,000	Comp.	Combination Cracking, Holmes-Manley
Troy Ref. Corp., Troy	300	.....	S	
Wadhams Oil Co., East Chicago	7,200	4,700	S-C	Kellogg
Total	205,500	155,200		

KANSAS

Barnsdall Ref. Corp., Wichita	5,000	2,500	S-C	Dubbs
Chase Ref. Co., Chase	800	.....	S	
Derby Oil Co., Wichita	7,000	2,500	S-C-A	Dubbs
Dickey Ref. Co., McPherson	3,500	1,500	C	
El Dorado Ref. Co., Eldorado	5,000	2,500	S-C	Winkler-Koch

KANSAS (Continued)

Company and plant location—	Crude oil cap.	Cracking cap.	Type of refinery	Type of cracking plant
Falcon Ref. Co., Great Bend	800	.....	S	
Fredonia Oil & Ref. Co., Fredonia	250	.....	S	
Globe Oil & Ref. Co., McPherson	12,000	6,000	S-C	Winkler-Koch
Kanotex Ref. Co., Arkansas City	12,000	5,000	S-C	Donnelly
Kreuger Oil & Ref. Co., Natoma	100	.....	S	
National Refining Co., Coffeyville	8,000	4,000	Comp.	Own
Petroleum Products Co., Chanute	800	.....	S	
Phillips Pet. Co., Kansas City	23,000	11,000	S-C	Own and Dubbs
Shallow Water Ref. Co., Scott City	1,500	.....	S-A	
Shell Pet. Corp., Arkansas City	20,000	9,700	S-C	Dubbs
Skelly Oil Co., Eldorado	20,000	10,000	C-A	Winkler-Koch
Sinclair Ref. Co., Kansas City	11,000	9,000	Comp.	Sinclair 600
Sinclair Ref. Co., Coffeyville	12,000	9,000	S-C	Sinclair 600
Socony-Vacuum Oil Co., Inc. (White Eagle), Augusta	15,000	16,000	S-C-A	Control Coil
Standard Oil Co. (Ind.), Neodesha	7,500	8,570	C	Cracking Coil
Vickers Pet. Co., Potwin	3,500	2,000	S-C	Dubbs
Total	173,750	99,270		

KENTUCKY

Aetna Oil Service, Inc., Louisville	3,000	....	S	Fleming
Ashland Oil & Ref. Co., Catlettsburg	4,700	2,700	S-C-A	Dubbs
Central Oil Co., Glasgow	250	.....	S	
Greenville Ref. Co., Inc., Greenville	100	.....	S	
Louisville Ref. Co., Louisville	5,000	2,200	S-C	Dubbs
South Kentucky Pipe Line Co., Somerset	300	.....	S	
Standard Oil Co. (Ohio), Latonia	8,000	5,000	S-C-A	Tube and Tank
Stoll Oil Ref. Co., Louisville	2,000	500	C-L	Stoll
Texas Co., Pryse	2,500	2,000	C	Holmes-Manley
Total	25,850	12,400		

LOUISIANA

Arkansas Fuel Oil Co., Bossier City	23,000	15,000	S-C	Tube and Tank, Own
Atlas Pipeline Corp., Shreveport	12,000	6,000	Comp.	Gyro
Bayou State Oil Corp., Hosston	750	.....	L	
Chalmette Pet. Corp., Chalmette	8,500	3,000	C	Winkler-Koch
Griswold Refineries, Inc., Shreveport	1,000	750	S-C	
Griswold Refineries, Inc., Rodessa	2,500	.....	S	
Pan American Pet. Corp., Destrehan	16,000	.....	A	
Rodessa Oil & Ref. Corp., Cedar Grove	7,500	5,000	C	Own
Shell Pet. Corp., Norco	21,000	14,000	S-C-A	Dubbs
Shoreline Oil Co., Shoreline	5,000	2,200	Comp.	
Standard Oil Co. of La., Baton Rouge	90,000	40,000	Comp.	Tube and Tank
Stanolind Oil & Gas Co., Superior	4,500	2,000	S-C	Cross
Texas Co., Shreveport	7,000	.....	S	
Total	198,750	87,950		

MARYLAND

Continental Oil Co., Baltimore	7,500	3,500	S-C-A	Cross
Pan American Ref. Corp., Baltimore	8,000	.....	A	
Standard Oil Co. of N. J., Baltimore	45,000	43,000	Comp.	Tube and Tank
Total	60,500	46,500		

MASSACHUSETTS

Cities Service Oil Co. of Pa., East Braintree	20,000	8,000	C-L-W	Doherty
Colonial Beacon Oil Co., Inc., Everett	21,000	19,800	S-C-A	Tube and Tank
Total	41,000	27,800		

MISSOURI

Joplin Ref. Co., Joplin	2,150	*2,500	S	Jenkins
Standard Oil Co. (Ind.), Sugar Creek	21,700	16,500	C-A	Holmes-Manley
Total	23,850	19,000		

*Shut down.

MICHIGAN

American Petro-Chemical Co., Detroit	1,200	500	S-C	Own
Bair Oil Co., F. M., Grand Ledge	270	.....	S	
Crystal Ref. Co., Inc., Carson City	2,000	.....	S	
Hanners Oil Co., Elsie	3,000	.....	S	
Inland Refineries, Inc., Pontiac	1,500	.....	S	
Inter-Lakes Ref. Co., Flat Rock	1,300	910	C	McKee-O'Con
Keystone Oil Ref. Co., Detroit	1,750	.....	S-L	
Leonard Refineries, Inc., Alma	3,000	*1,500	S-C	Dubbs
McClanahan Refineries, Inc., St. Louis	3,500	1,200	C	Dubbs
Midwest Refineries, Inc., Alma	3,200	.....	S	
Naph-Sol Ref. Co., Muskegon	2,500	1,500	S-C	Dubbs
North American Pet. Co., Saginaw	800	.....	S	

MICHIGAN (Continued)

Company and plant location—	Crude oil cap.	Cracking cap.	Type of refinery	Type of cracking plant
Old Dutch Ref. Co., Muskegon	5,000	1,500	S-C	T.V.P.
Producers Ref., Inc., West Branch	1,500	.....	S	
Pure Oil Co., Midland	3,000	.....	S	
Roosevelt Oil Co., Mount Pleasant	6,000	.....	S	
Socony-Vacuum Oil Co., Inc., Trenton	13,600	12,950	C	Dubbs and Control Coil
Sweet Oil Ref. Co., Wyman	2,000	.....	S	
Tiger Ref. Co., Grand Rapids	1,000	.....	S	
Total	49,520	17,160		

*Under construction.

MONTANA

Big West Oil Co. of Montana, Kevin	1,200	1,000	S-C	Dubbs
Carroll, L. Ray, Roundup	100	.....	S	
Consumers Ref. Co., Collins	500	.....	S	
Continental Oil Co., Lewistown	800	.....	S	
Cut Bank Ref. Co., Cut Bank	350	.....	S	
Deloraine Ref. Co., Oilmont	300	.....	S	
Dunlap Refinery, Cat Creek	75	.....	S	
Hart Refineries, Hedgesville	100	.....	S	
Hart Refineries, Missoula	300	.....	S	
Hole Bros. Ref., Cut Bank	350	.....	S	
Home Oil & Ref. Co., Great Falls	1,750	1,100	C	Dubbs
Home Oil & Ref. Co., Conrad	500	.....	S	
Hunt, Eugene, Winnett	400	.....	S	
Independent Ref. Co., Laurel	5,000	1,600	S-C-A	Dubbs
Minntona Oil Co., Molt	30	.....	S	
Northwest Ref. Co., Cut Bank	*2,500	1,000	S-C	Dubbs
Red Lodge Refinery, Red Lodge	100	.....	S	
Russell Oil Co., Billings	1,000	.....	S	
Russell Oil Co., Butte	500	.....	S	
Snow Cap Oil Co., Sunburst	400	300	S-C	Own
Texas Co. (International), Sunburst	4,500	3,500	C	deFlorez
Unity Pet. Corp., Havre	800	.....	S	
Unity Pet. Corp., Kalispell	800	800	S-C	Vapor Phase
Yale Oil Corp. of S. Dak., Billings	2,000	.....	S-A	
Total	24,355	9,300		

*Under construction.

NEBRASKA

Carpenter, Terry, Scottsbluff	750	.....	S	
Chadron Refinery, Chadron	100	.....	S	
Federal Pet. Products Co., Harrison	75	.....	S	
Midland Ref. Corp., Crawford	250	.....	S	
Total	1,175			

NEW JERSEY

Barber Co., Inc., Maurer	10,000	3,000	A	Cross
Cities Service Oil Co., of Pa., Petty Island	12,000	7,000	S-C-L	Doherty
Middlesex Ref. Co., Piscataway	6,500	.....	S	
Socony-Vacuum Oil Co., Inc., Paulsboro	20,000	3,600	Comp.	Ellis
Standard Oil Co. of N. J., Bayonne	60,000	.....	L-W-A	
Standard Oil Co. of N. J., Linden	65,000	165,000	C-W	Tube and Tank
Standard Oil Co. of N. J., Jersey City	15,000	.....	L-W	
Tide Wate Oil Co., Bayonne	50,000	25,000	Comp.	Tube and Tank
Warner-Quinlan Oil Co., Warners	18,000	.....	S-A	
Total	256,500	203,600		

NEW MEXICO

Aerex Co., The, Bloomfield	100	.....	S	
Basin Ref. Co., Aztec	100	.....	S	
Continental Oil Co., Farmington	600	.....	S	
Continental Oil Co., Artesia	1,500	.....	S	
Continental Oil Co., Albuquerque	500	.....	S	
Malco Refineries, Inc., Artesia	2,000	900	S-C	Dubbs
McNutt Oil & Ref. Co., Brickland	1,000	500	S-C	Donnelly
Pecos Diamond Ref. Co., Inc., Artesia	500	.....	S	
Valley Ref. Co., Roswell	750	.....	S-A	*Dubbs
Total	7,050	1,400		

*Under construction.

NEW YORK

Allegany Refiners, Inc., Bolivar	1,200	.....	S	
Gulf Oil Corp., Staten Island	15,000	.....	S	
Sinclair Ref. Co., Wellsville	10,000	6,000	Comp.	Sinclair 600
Socony-Vacuum Oil Co., Inc., Olean	6,500	1,000	Comp.	Cross

MARMON-HERRINGTON

All-Wheel-Drive Equipment

SAVES BIG SUMS IN GEOPHYSICAL SURVEYS

FEWER BREAKDOWNS—The Marmon-Herrington all-wheel-drive Ford V-8, as well as all other types of Marmon-Herrington trucks, is better adapted to all types of geophysical, exploitation and surveying work in the oil fields than any other equipment ever produced. It is especially engineered to give a far greater degree of safety, traction and efficiency, thus eliminating costly breakdowns when operations call for difficult off-the-road work. A great saving in service costs and a great increase in service hours are the result.

MORE HOURS OF CREW TIME—The ability of Marmon-Herrington all-wheel-drive units to penetrate hitherto inaccessible territory, to operate more rapidly and more successfully over *any* kind of terrain, and to require fewer stops for repairs make possible more continuous hours of profitable crew time. There is no costly loss of time. Marmon-Herrington all-wheel-drive traction can progress smoothly with the utmost dependability and do a better job. Any type of surveying work is made easier than ever before.

TWO TO THREE TIMES LONGER LIFE—Despite the tremendous wear and strain placed on vehicles used in geophysical work, the life of a Marmon-Herrington all-wheel-drive is lengthened materially because it is engineered, designed, built and adapted to the very kind of work that is necessary. Some records show that Marmon-Herringtons will last two to three times longer than the ordinary truck. This applies to the Marmon-Herrington all-wheel-drive Ford V-8—costing far less than any other all-wheel-drive truck on the market—and it likewise applies to the regular Marmon-Herrington line.

"FROGGING" ELIMINATED—Every oil man knows how destructive or at best what a hindrance "frogging" can be to equipment. With a Marmon-Herrington all-wheel-drive Ford V-8, you don't have to worry about it. Drive through the FRONT wheels as well as the REAR provides sure-footed all-wheel-drive traction that gives the ability to move steadily and surely over all kinds of terrain. Spinning of the wheels is rarely necessary. This is one of the reasons why a Marmon-Herrington can operate in a highly satisfactory manner in territory which other types of equipment cannot even penetrate. Marmon-Herrington all-wheel-drive conversions are available on passenger, light delivery, commercial and truck Ford chassis.

FAR GREATER UTILITY—Marmon-Herrington all-wheel-trive trucks will go places, do things, give better results than any other similar equipment ever produced—and they precisely meet the requirements of every branch of the oil industry. When Marmon-Herrington units are in operation, it is not necessary to utilize one truck for one kind of work and another truck for another because Marmon-Herringtons will operate with complete satisfaction either on or off the highway. And, Marmon-Herrington is the only manufacturer to produce a COMPLETE all-wheel-drive line—from all-wheel-drive Ford V-8 passenger and commercial cars to heavy duty four- and six-wheel-drive units in the regular line (more than 30 models) having capacities up to more than 50,000 pounds.

EASIER TO SERVICE—LOWER COSTS—When you operate Marmon-Herrington all-wheel-drive Ford V-8's you have the benefit of world-wide Ford service facilities. Your service problems thus are simplified and your costs lowered. No other all-wheel-drive ever manufactured can be purchased as cheaply, operated as economically and serviced as easily and inexpensively as the Marmon-Herrington all-wheel-drive Ford V-8. If you do not have complete literature, specifications and prices, it will pay you to write for them at once—without obligation, of course.

World's Leading All-Wheel-Drive Engineers and Manufacturers
All-Wheel-Drive Trucks of Every Type for Every Branch of the Oil Industry

•

MARMON-HERRINGTON COMPANY, Inc.
FACTORY AND GENERAL OFFICES: INDIANAPOLIS, INDIANA, U. S. A.

MARMON-HERRINGTON
ALL-WHEEL-DRIVE TRUCKS

NEW YORK (Continued)

Company and plant location—	Crude oil cap.	Cracking cap.	Type of refinery	Type of cracking plant
Socony-Vacuum Oil Co., Inc., Brooklyn.	19,000	10,000	Comp.	Cross, deFlorez
Socony-Vacuum Oil Co., Inc., Buffalo ..	7,000	4,000	Comp.	Cross, deFlorez
Total	56,700	21,000		

OHIO

Alco Ref. Co., Canton	1,700	1,000	S-C	Dubbs
Canfield Oil Co., Cleveland	1,500	.....	S	
Gulf Ref. Co., Toledo	16,000	8,000	S-C	Gulf
Gulf Ref. Co., Cincinnati	16,000	8,000	S-C	Gulf
Montgomery, H. A., Co., Dyer	*500	.....	L-W-A	
National Ref. Co., Findlay	3,200	1,400	Comp.	Own
National Ref. Co., Marietta	700	.....	L-W	
Peninsula Oil Co., Port Clinton	50	.....	S	
Pure Oil Co., Heath	11,000	8,000	S-C	High and Low Pressure
Pure Oil Co., Toledo	15,500	13,000	S-C	High and Low Pressure
Standard Oil Co. (Ohio), Cleveland ...	24,000	10,000	Comp.	Tube and Tank
Standard Oil Co. (Ohio), Toledo	12,000	4,500	Comp.	Tube and Tank
Standard Oil Co. (Ohio), Lima	7,500	4,000	S-C	Solar
Sun Oil Co., Toledo	14,000	10,000	S-C	Own
Total	123,650	67,900		

OKLAHOMA

Anderson-Prichard Ref. Corp., Cyril ...	6,000	3,500	S-C-A	Winkler-Koch
Barnsdall Ref. Corp., Barnsdall	5,000	3,000	Comp.	Cross
Barnsdall Ref. Corp., Okmulgee	7,500	3,000	S-C	Cross
Bell Oil & Gas Co., Grandfield	5,000	2,500	S-C	Dubbs
Black Gold Ref. Co., Oklahoma City ...	2,500	1,250	S-C	Dubbs
Champlin Ref. Co., Enid	15,000	6,000	C-L-W	Winkler-Koch
Continental Oil Co., Ponca City	26,000	12,250	Comp.	Dubbs, Cross
Cushing Ref. & Gaso. Co., Blackwell ...	1,800	2,000	S	
Cushing Ref. & Gaso. Co., Cushing	4,000	2,000	C	Dubbs
Deep Rock Oil Corp., Cushing	10,000	5,500	Comp.	Dubbs
Eason Oil Co., Enid	4,000	1,500	S-C	Jenkins
Empire Oil & Ref. Co., Okmulgee	4,000	1,200	Comp.	Doherty
Empire Oil & Ref. Co., Ponca City	12,000	4,500	Comp.	Doherty, Dubbs
Globe Oil & Ref. Co., Blackwell	8,000	4,000	S-C	Winkler-Koch
Johnson Oil Ref. Co., Cleveland	5,500	2,000	S-C	Dubbs
Knox Ref. Co., Covington	250	.....	S	
Mid-Continent Pet. Corp., West Tulsa ..	40,000	.....	Comp.	Own
Ohio Oil Co., Bristow	5,000	1,500	S-C	Kellogg
Omar Ref. Co., Garber	4,000	2,500	S-C	Winkler-Koch
Peppers Gasoline Co., Oklahoma City ..	500	.....	S	
Phillips Pet. Co., Okmulgee	6,000	3,000	S-C-L	Dubbs
Pilgrim, Inc., Kingston	70	.....	L	
Pure Oil Co., The, Muskogee	10,000	4,700	Comp.	High and Low Pressure
Rock Island Ref. Co., Beckett	6,500	2,000	S-C	Winkler-Koch
Sinclair Ref. Co., Sand Springs	8,000	4,000	C-L-W	Cross
Sooner State Oil & Gas Co., Oklahoma City	500	.....	S	
Sun Oil Co., Yale	5,000	.....	S	
Sunray Oil Co., Allen	6,500	1,500	C-A	Dubbs
Texas Co., West Tulsa	16,000	16,500	Comp.	Holmes-Manley, Pressure Coke
Tide Water Associated Oil Co., Drumright	15,000	7,000	S-C	Tube and Tank
Triangle Prod. & Ref. Co., Oklahoma City	1,200	.....	S	
West, S. L., Oil & Gas Co., Oklahoma City	600	.....	S	
Wilcox, H. F., Oil & Gas Co., Bristow ..	5,000	1,500	S-C	Dubbs
Total	246,420	97,500		

PENNSYLVANIA

Atlantic Ref. Co., Philadelphia	80,000	38,800	Comp.	Lewis, Cross, deFlorez, Kellogg
Berry, James B., Sons Co., Inc., Oil City	2,500	.....	Comp.	Dubbs
Bradford Penn Ref. Corp., Clarendon ..	1,500	.....	Comp.	
Bradford Oil Ref. Co., Bradford	2,000	.....	L-W	
Canfield Oil Co., Coraopolis	1,500	.....	L	
Cities Service Oil Co. of Pa., Titusville.	3,000	.....	S-L-W	
Conewango Ref. Co., Warren	2,000	.....	L	
Continental Ref. Co., Oil City*	800	2,400	Comp.	Dubbs
Crystal Oil Works Co., Rouseville	1,000	.....	S	
Daugherty Ref., Petrolia	2,000	.....	L	
Freedom Oil Works Co., Freedom	2,500	500	Comp.	Dubbs
Franklin Creek Ref. Corp., Franklin ...	2,000	.....	L	
Gulf Ref. Co., Philadelphia	30,000	19,000	Comp.	Gulf
Gulf Ref. Co., Pittsburgh	10,000	3,000	C	Gulf
Kendall Ref. Co., Bradford	4,000	2,200	L-W	Dubbs
Oil Creek Ref. Co., Titusville	1,700	.....	L-W	
Penna. Oil Prod. Ref. Co., Eldred	5,000	1,750	S-C-L	Conerty

PENNSYLVANIA (Continued)

Company and plant location—	Crude oil cap.	Cracking cap.	Type of refinery	Type of cracking plant
Pennsylvania Ref. Co., Titusville	2,000	.....	L	
Pennsylvania Ref. Co., Karns City	2,000	.....	Comp.	
Pennzoil Co., Rouseville	10,000	5,000	Comp.	Dubbs
Pennzoil Co., Oil City	.....	4,500	L	Dubbs
Pure Oil Co., Marcus Hook	20,000	9,000	Comp.	High and Low Pressure
Quaker State Oil Ref. Corp., Emlenton..	2,000	850	Comp.	Dubbs
Quaker State Oil Ref. Corp., Oil City ..	2,500	.....	Comp.	
Quaker State Oil Ref. Co., Farmers Valley	3,000	1,250	Comp.	Dubbs
Sinclair Ref. Co., Marcus Hook	28,000	29,500	C-S-A	Sinclair 600
Sloan & Zook Ref. Co., Warren	1,500	.....	Comp.	
Sherwood Ref. Co., Warren	800	.....	Comp.	
Starlight Ref. Co., Karns City	300	.....	L	
Sun Oil Co., Marcus Hook	63,000	65,000	Comp.	Own
Superior Oil Works, Warren	500	.....	L-W-A	
Ultra-Penn Ref. Co., Bruin	1,000	400	C	Snodgrass
United Ref. Co., Warren	3,500	1,200	Comp.	Dubbs
Valvoline Oil Co., Franklin	.....	.....	Grease	
Valvoline Oil Co., Butler	3,000	.....	L-W	
Warr-Penn Ref. Co., Warren	1,500	.....	L	
Waverly Oil Works Co., Pittsburgh	1,500	600	Comp.	Cross
Wolverine-Empire Ref. Co., Inc., Reno .	2,500	400	Comp.	Dubbs
Total	300,100	180,850		

*Cracking plant jointly owned by Pennzoil Co., James B. Berry Sons Co., Inc., Wolverine Empire Ref. Co., Inc., and Continental Ref. Co.

RHODE ISLAND

Socony-Vacuum Oil Co., Inc., Providence	5,000	4,000	C-A	Cross
Texas Co., Providence	2,000	.....	A	
Total	7,000	4,000		

SOUTH CAROLINA

Standard Oil Co. of N. J., Charleston ..	6,500	.....	A	

SOUTH DAKOTA

Hot Springs Ref. Co., Hot Springs	160	.....	S	
Rex Oil Refinery, Inc., Rapid City	200	.....	S	
Total	360			

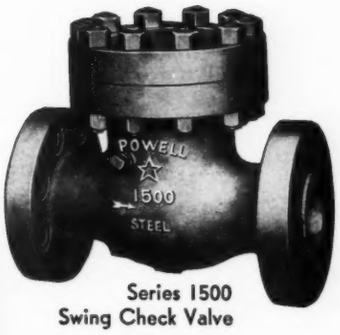
TENNESSEE

Russell Prod. Co., The, Sunbright	130	.....	S	

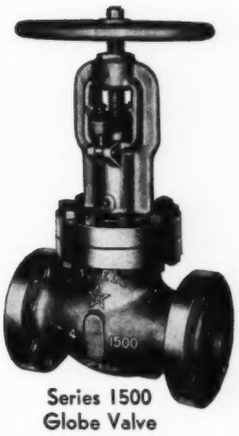
TEXAS

Aero Gas Ref. Co., Pecos	225	.....	S	
Alto Ref. Co., Clarkwood	250	.....	S	
Amsco Ref. Co., Corpus Christi	3,300	.....	S	
Amsco Ref. Co., Mirando City	4,000	1,200	S-C-L	Own
American Pet. Co., Houston	10,000	.....	S	
Atlantic Ref. Co., Atreco	*18,000	.....	Comp.	Kellogg
Baird Ref. Co., Baird	1,500	1,000	Comp.	Own
Beacon Oil & Ref. Co., Henderson	4,500	.....	S	
Bell Oil & Gas Co., Gladewater (Solvex Refineries, Inc.)	4,500	2,000	S-C	Dubbs
Bennett Ref. Co., Houston	3,000	.....	S	
Carson, M. D., Ref. Co., Brady	150	.....	S	
Cascade Ref. Co., Kilgore	2,000	.....	S	
Chief Ref., Inc., Gladewater	2,000	.....	S	
Clay Ref. Co., Arp.	3,000	1,000	S-C	Own
Coastal Refineries, Inc., Port Isabel ...	5,000	.....	S	
Coleman Ref. Co., Coleman	750	.....	S	
Cosden Oil Corp., Big Spring	15,000	10,000	Comp.	Dubbs
Col-Tex Ref. Co., Colorado	12,000	3,700	S-C-A	Richmond
Concho Ref. Co., San Angelo	200	.....	S-L	
Continental Oil Co., Wichita Falls	4,000	2,200	S-C	Cross
Corpus Christi Ref. Corp., Corpus Christi	7,500	.....	S	
Crown Central Pet. Corp., Houston	15,000	6,000	Comp.	Holmes-Manley
Crown Oil Co., Fort Worth	2,000	.....	S	
Danciger Oil & Refineries, Inc., Pampa.	6,000	4,000	S-C	Biddison-Boyd
Danciger Oil & Refineries, Inc., Longview	6,000	4,000	S-C	Biddison-Boyd
Danube Oil Corp., Borger	250	.....	S	
Davis Refinery, Inc., Corpus Christi ...	1,000	.....	S	
Eastern States Pet. Co., Houston	15,000	8,000	S-C	Dubbs
East Texas Ref. Co., Longview	10,000	5,000	S-C	Donnelly
Exchange Pet. Corp., Albany	800	.....	S	
Falls Ref. Co., Inc., Wichita Falls	2,500	.....	S	
Gainesville Ref. Corp., Gainesville	1,800	.....	S	
General American Oil Co., Arp.	4,000	.....	S	
General American Oil Co., Gladewater..	4,000	1,500	S-C	Own
General American Oil Co., Overton	5,500	2,000	S-C	Own
Graford Ref. Co., Mineral Wells	50	.....	S	
Gratex Ref. & Fuel Oil Co., Graham ...	300	.....	S	
Gulf Ref. Co., Port Arthur	100,000	50,000	Comp.	Gulf

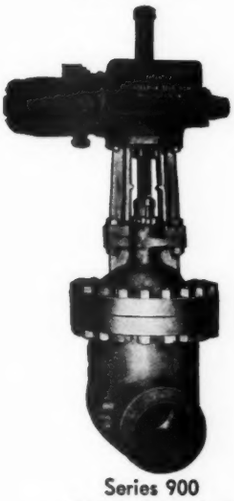
Series 150
Globe Valve



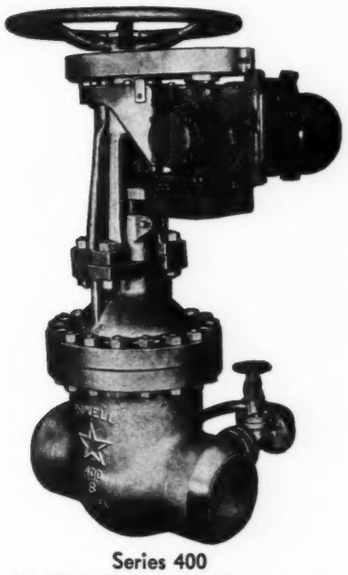
Series 1500
Swing Check Valve



Series 1500
Globe Valve

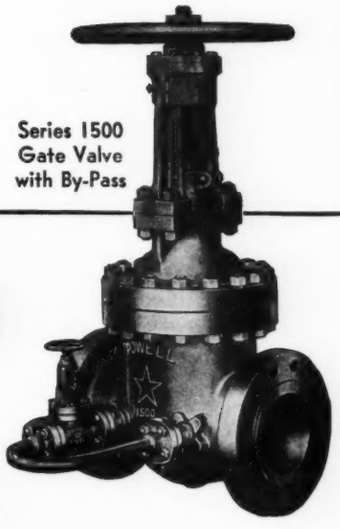


Series 900
Motor Operated
Gate Valve



Series 400
Welding End Motor Operated
Gate Valve with By-Pass

Series 900
Horizontal Check Valve



Series 1500
Gate Valve
with By-Pass

HIGH TEMPERATURE AND HIGH PRESSURE

POWELL STEEL VALVES

FOR OIL AND GAS SERVICE — REFINERY STEAM POWER PLANTS

The long life and dependable performance of Powell Steel Valves depend on three essentials—design, workmanship, materials. Each factor of individual importance is given individual consideration. Powell Steel Valves—available in a variety of materials, sizes, and types—are described in detail in Catalog No. 101.

POWELL VALVES

THE WM. POWELL CO. CINCINNATI, OHIO

TEXAS (Continued)

Company and plant location—	Crude oil cap.	Cracking cap.	Type of refinery	Type of cracking plant
Gulf Ref. Co., Fort Worth	6,000	3,000	C	Gulf
Gulf Ref. Co., Sweewater	5,000	2,500	C	Gulf
Hightower Oil & Ref. Co., Brownwood	500	.....	S	
Houston Oil Co. of Tex., Viola	1,000	500	S	Dubbs
Howard County Ref. Co., Big Spring	2,000	.....	S	
Humble Oil & Ref. Co., Baytown	120,000	84,000	Comp.	Cross, Tube and Tank
Humble Oil & Ref. Co., Ingleside	15,000	17,000	Comp.	Tank and Tube
Humble Oil & Ref. Co., San Antonio	4,500	.....	S	
Humble Oil & Ref. Co., Neches	5,000	.....	S	
Hurricane Pet. Corp., Overton	4,500	2,000	S-C	Donnelly
Hurricane Pet. Corp., Arp	3,000	700	S-C	Donnelly
Ina Oil & Ref. Co,. Hondo	500	.....	S	
Jacksboro Ref. Co., Jacksboro	250	.....	S	
K. D. Ref. Co., Talco	250	.....	S	
Kilgore Ref. Co., Kilgore	2,000	.....	S	
LaSalle Pet. Co., Burkburnett	2,500	.....	S	
Magnolia Pet. Co., Beaumont	120,000	44,000	Comp.	Cross
Magnolia Pet. Co., Fort Worth	5,500	3,000	S-C	Cross
Magnolia Pet. Co., Corsicana	4,000	.....	S	
Magnolia Pet. Co., Luling	6,800	5,800	S-C	Control Coil
Martin Ref. Co., Gladewater	3,000	.....	S	
Mentone Oil & Ref. Co., Arno	1,000	.....	S	
Mertzon Ref. Co., Mertzon	500	.....	S	
Midway Ref. Co., Coleman	300	.....	S	
Minerva Ref. Co., Minerva	2,000	.....	S	
Moutray Oil Co., Hawley	1,200	.....	S-L	
Muenster Ref. Co., Muenster	300	.....	S	
Nortex Ref. Co., Newcastle	100	.....	S	
North Texas Oil & Ref. Co., Gainesville	600	.....	S	
Ocean Pet. Corp., Kilgore	3,000	.....	S	
Ohio Oil Co., Fort Worth (Hodge)	5,000	1,500	Comp.	Kellogg
Olney Oil & Ref. Co., Olney	2,500	1,500	S-C	Donnelly
Onyx Ref. Corp., Hawley	1,500	.....	S	
Paluxy Asphalt Co., Talco	5,000	1,800	S-C	Own
Pan American Ref. Corp., Texas City	30,000	30,000	Comp.	Combination
Panhandle Ref. Co., Wichita Falls	4,200	1,900	C	Dubbs
Panhandle Ref. Co., Kings Mill	2,500	.....	S	
Panhandle Ref. Co., Lueders	900	.....	S	
Pettus Oil & Ref. Co., Pettus	1,000	.....	S	
Pettus Oil & Ref. Co., Pettus (Midway plant leased)	1,000	.....	S	
Phillips Pet. Co., Borger	50,000	48,000	S-C	Own
Phoenix Ref. Co., Bruni	1,000	.....	S	
Phoenix Ref. Co., San Antonio	1,000	.....	S	
Pioneer Oil & Ref. Co., Somerset	2,000	.....	S-L	
Premier Oil & Ref. Co., Willow Springs	4,500	3,000	S-C	
Pure Oil Co., Smiths Bluff	32,000	20.000	S-C	High Pressure
Rado Ref. Co., McAllen	800	200	S-C	Own
Ranne Ref. Co., San Antonio	700	.....	S	
Ranne Ref. Co., Mathis	1,000	.....	S	
Refugio Refinery, Refugio	300	.....	S	
Republic Oil Ref. Co., Texas City	14,000	6,000	C	Winkler-Koch
Rio Ref. Co., Sullivan City	1,000	.....	S	
Sageland Refining Co., Sweetwater	1,000	.....	S	
San Antonio Ref. Co., Southton	100	.....	S	
Shamrock Oil & Gas Corp., Sunray	2,500	.....	S	
Shamrock Oil & Gas Corp., Lefors	1,700	.....	S	
Shamrock Oil & Gas Corp., Sheerin	.....	*2,500	C	Dubbs
Shell Pet. Corp., Houston	56,000	36,000	S-C	Dubbs
Sinclair Ref. Co., Houston	44,000	46,000	C-L-S	Sinclair 600
Sinclair Ref. Co., Fort Worth	4,000	3,000	C-S	Sinclair 600
Sinclair Ref. Co., Gladewater	2,500	.....	S	Sinclair 600
Solvex Refineries, Inc., Gladewater	5,000	2,500	Comp.	Dubbs
Southport Pet. Co., Kilgore	4,000	4,000	S-C	Own
Southport Pet. Co., Texas City	12,000	10,000	S-C	Donnelly
Southwestern Oil & Ref. Co., Corpus Christi	3,000	.....	S	
Stamford Ref. Co., Stamford	300	.....	S	
Standard Oil Co. of Tex., El Paso	14,000	5,000	S-C	Dubbs
Starlight Ref. Co., Inc., Ballinger	500	.....	S	
Stone Oil Co., Texas City	7,500	2,000	S	Jenkins
Sunshine Refinery, Livington	125	.....	S	
Talco Asphalt & Ref. Co., Mount Pleasant	*5,200	5,200	Comp.	Dubbs
Taxman Ref. Co., Wichita Falls	3,000	1,500	S-C	Donnelly
Taylor Ref. Co., Taylor	1,000	.....	S	
Texas Pacific Coal & Oil Co., Fort Worth	700	.....	L	
Texas Pacific Coal & Oil Co., Caddo	800	.....	S	
Texas Co., Amarillo	6,000	4,000	C	deFlorez, Pressure Coke
Texas Co., El Paso	2,000	2,000	C	Holmes-Manley
Texas Co., San Antonio	5,000	5,000	C	Holmes-Manley
Texas Co., West Dallas	16,000	12,500	C	Holmes-Manley, deFlorez, Pressure Coke
Texas Co., Houston	20,000	2,500	C	Tube and Tank
Texas Co., Port Neches	25,000	.....	A	
Texas Co., Port Arthur	100,000	95,000	Comp.	Holmes-Manley, deFlorez,

TEXAS (Continued)

Company and plant location—	Crude oil cap.	Cracking cap.	Type of refinery	Type of cracking plant
Terminal Ref. Corp., Corpus Christi	3,000	.....	S	
Tower Ref. Co., Overton	3,000	1,000	S-C	Own
Tucker Oil Co., Burkburnett	250	.....	S	
Tydal Ref. Co., Inc., Gainesville	2,000	.....	S	
Tyler Texas Oil & Ref. Co., Tyler	10,000	3,250	S-C	Dubbs
Tyrene Ref. Co., Anarene	200	.....	S	
Valley Ref. Co., Harlingen	1,000	.....	S	
Waggoner Ref. Co., Inc., Electra	4,500	.....	S	
West Texas Ref. Co. Pecos	1,000	†3,000	S	Jenkins
Western Ref. Co., Mertzon	1,000	.....	S	
Wickett Ref. Co., Wickett	2,500	.....	S	
Wood-Moore Corp., Port Lavaca	2,000	.....	S	
Total	1,128.450	621,450		

*Under construction. †Shut down.

UTAH

Utah Oil Ref. Co., Salt Lake City	7,000	6,800	Comp.	Holmes-Manley
Wasatch Oil Ref. Co., Woods Cross	1,500	800	S-C	Vapor Phase
Total	8,500	7,600		

VIRGINIA

Texas Co., Norfolk	2,000	.....	A	

WEST VIRGINIA

Carbide & Carbon Chemicals Corp., So. Charleston	2,000	2,000	C	Gyro
Elk Ref. Co., Falling Rock	2,500	1,200	Comp.	Dubbs
Pure Oil Co., Cabin Creek	4,000	2,500	Comp.	Low Pressure
Quaker State Oil Ref. Corp., St. Marys.	2,000	850	Comp.	Dubbs
Total	10,500	6,550		

WYOMING

Bay Petroleum Corp., Cheyenne	500	.....	S	
C & H Refinery, Lusk	150	.....	S	
Continental Oil Co., Glenrock	2,800	1,800	S-C	Cross
Crook County Refinery, Sundance	50	.....	S	
Elk Horn Gas Refinery, Osage	55	.....	S	
Gillette Ref. Co., Sheridan	300	.....	S	
Gray Refinery, Inc., Newcastle	350	.....	S	
Mission Oil Co., Thermopolis	1,500	.....	S-A	
Moorcroft Ref. Co., Inc., Moorcroft	63	.....	S	
Northwestern Petroleum, Osage	280	.....	S	
Oreana Ref. Co., La Barge	100	.....	S	
Park Ref. Co., Cody	1,500	.....	S	
Ralston Refinery, Upton	40	.....		
Resolute Oil Corp., Park County	500	.....	S	
Salt Creek Ref. Co., Columbine	200	.....	S	
Sinclair Ref. Co., Parco	8,000	4,000	C-S	Dubbs
Socony-Vacuum Oil Co., Inc. (White Eagle), Casper	6,000	2,000	S-C-A	Control Coil
Standard Oil Co. (Ind.), Casper	12,600	6,500	Comp.	Kellogg
Standard Oil Co. (Ind.), Greybull	4,000	1,900	C-A	Cross
Texas Co., Casper	7,000	8,600	C	Holmes-Manley, Pressure Coke
Texas Co., Cody	3,000	1,500	C	Holmes-Manley
Texas Co. (Calif. Pet.), Calpet	300	.....	S	
Whitman, A. J., Le Roy	200	.....	S	
Wyoming Gas & Oil Co., Osage	700	.....	S	Cross
Yale Oil Corp., Worland	200	.....	S	
Total	48,390	28,300		

Shutdown Plants in United States

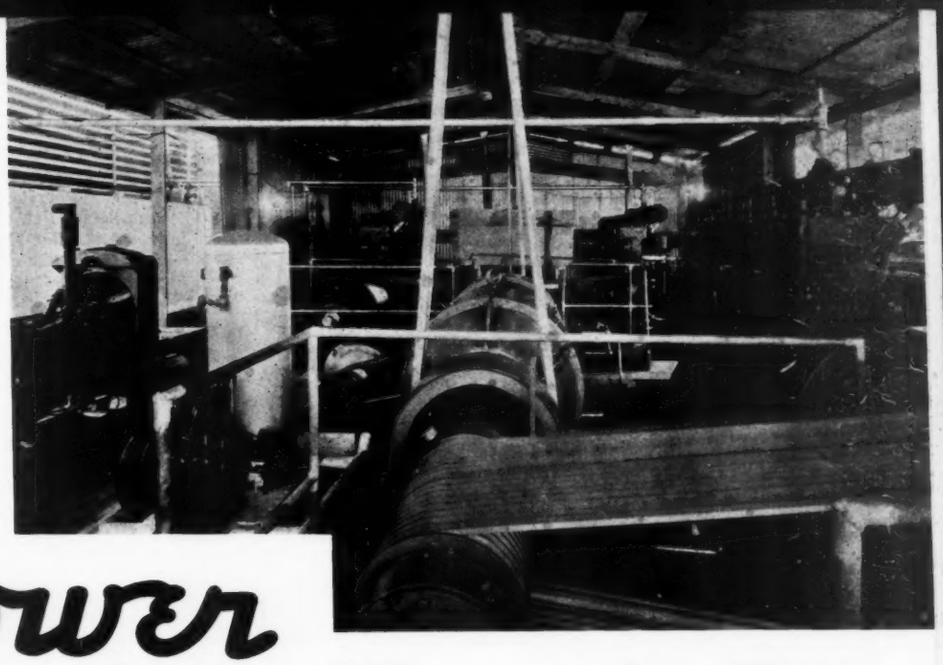
ARKANSAS

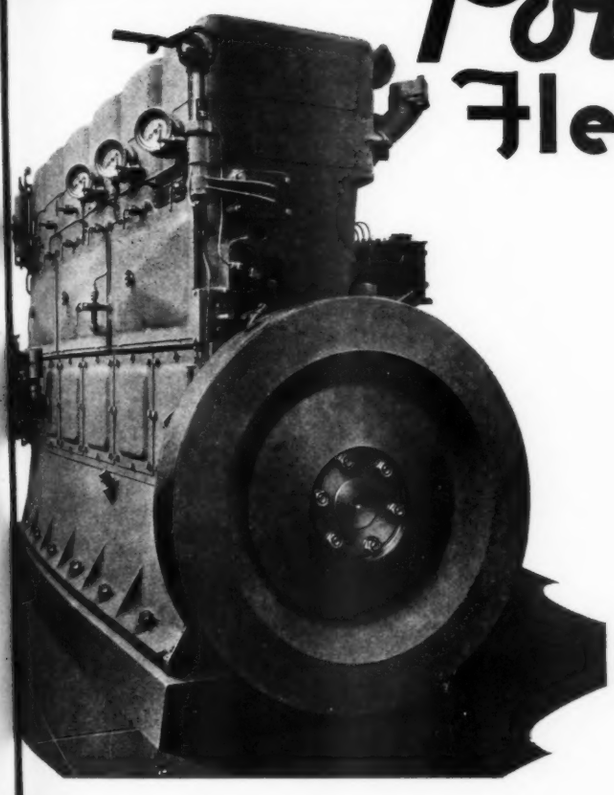
Company and plant location—	Crude oil cap.	Cracking cap.	Type of refinery	Type of cracking plant
Houston Oil Co. of Texas, Camden	3,500	.....	C-T	Dubbs

CALIFORNIA

American Oil & Ref. Co., Long Beach	2,500	.....	S	
California Ref. Co., Seal Beach	2,500	.....	S	
Cameron, J. D., Ref., Taft	350	.....	S	
Eden Ref. Co., Huntington Beach	1,500	.....	A	
Fletcher Oil Co., Inc., Los Angeles	3,000	.....	S-A	
Hercules Gasoline Co., Los Angeles	1,250	.....	S	
Interstate Oil Corp., Taft	250	.....	S	
Los Alamitos Oil & Ref. Co., Seal Beach	1,250	.....	S	
Los Angeles Ref. Co., Bandini	3,000	.....	S	

Three ATLAS DIESELS Power Flexible Electric Rig

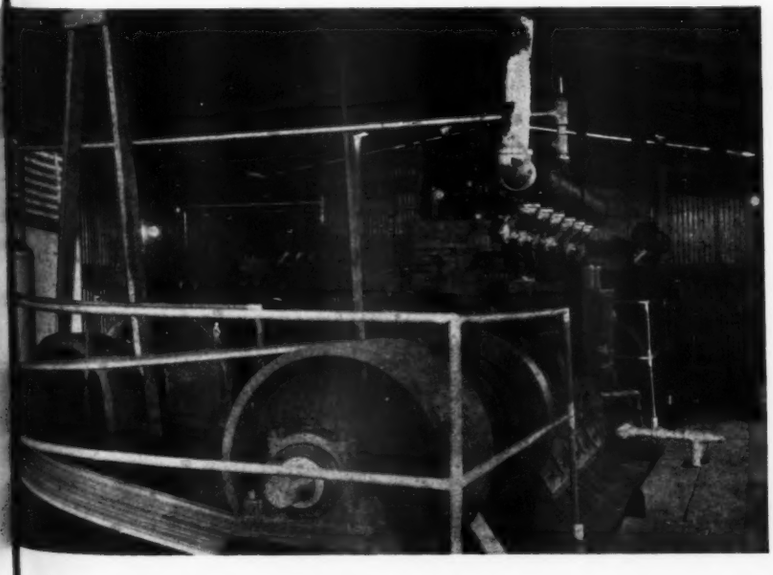




The Atlas Diesel Electric Drilling Rig shown here, and said to be the most powerful and flexible yet put on the market, is owned by the Noble Drilling Company and drilled its first hole near Ardmore, Oklahoma.

Three 240 H.P. Atlas Imperial Drilling Diesels of the enclosed type, developing their rated horsepower at 514 R.P.M., are V-belt connected to one 150 KW and one 240 KW, direct current, 350 volt Allis-Chalmers generators turning at 1200 R.P.M. Two separately driven 25 KW exciters are used, one V-belt connected to the main generator shaft, the other driven by a gasoline engine, the arrangement providing light and auxiliary power when rigging up and during down time on the main plant. The auxiliary generating unit is also used to start the engines electrically by means of a special winding in each generator.

The drilling motor is an Allis-Chalmers developing 400 H.P. at 1000 R.P.M. It is direct connected to a Falk reduction gear which is connected to the drawworks by roller chain. The two mud pumps are driven by 225 H.P. motors. The generators are differential compound wound with separately excited field winding, and a series winding differentially connected to the shunt winding, which gives a drooping voltage when the motor torque increases and a rising voltage when the motor torque decreases. This characteristic is equivalent to an infinite number of automatically changing gear ratios between the engine and the drawworks, permitting the motor to accelerate and hoist the maximum loads without stalling the engines.



The flexibility of this rig cannot be duplicated by steam or any other mechanical drive system, where the driller is continually in doubt as to what gear ratio to use. This doubt results in loss of time and subjects the entire rig to excessive strains which result in breakage and attendant down time.

Besides its great flexibility this arrangement is also very economical. It eliminates the water problem incident to an undeveloped area, and it is cheaper to use a small amount of fuel oil than large volumes of high pressure gas. May we tell you more about this rig or about Diesel drilling in general? Your inquiries are solicited and given prompt attention.

ATLAS IMPERIAL DIESEL ENGINE CO.
Oakland, California - - - Mattoon, Illinois.
OIL COUNTRY DISTRIBUTORS:
K. S. RICHARDS . Wichita . Oklahoma City . Fort Worth . Houston

ATLAS IMPERIAL

CALIFORNIA (Continued)

Company and plant location—	Crude oil cap.	Cracking cap.	Type of refinery	Type of cracking plant
Producers Ref. Co., Long Beach	1,200	.....	S	
Redondo Oil & Ref. Co., Torrance	1,000	.....	S	
Rice Ranch Oil Co., Santa Maria	800	.....	A	
Richfield Oil Co. of Calif., Bakersfield	2,000	.....	S	
Richfield Oil Co. of Calif., Los Angeles	4,000	.....	S	
Signal Oil Co., Hynes	5,000	.....	S	
Standard Oil Co. of Calif., Taft	1,500	.....	S	
Stockton Oil Co., Inc., Stockton	3,000	.....	S	
Texas Co., The, Coalinga	500	.....	S	
Union Oil Co. of Calif., Avila	10,000	.....	S	
White Star Ref. Co., Long Beach	2,000	.....	S	
Total	45,350			

COLORADO

McGarr, Pet. Corp., Kline	80	.....	S	
Midland Oil Ref. Co., Denver	1,000	.....	S	
Total	1,080			

GEORGIA

Atlantic Ref. Co., Brunswick	5,000	3,600	Comp.	Lewis

KANSAS

Cusco Oil & Ref. Co., Chase	3,500	.....	S	
Golden Rule Oil Co., North Wichita	1,000	500	C	Jenkins
Russell Ref. Co., Russell	1,250	.....	S	
Shaffer Ref. Co., Hutchinson	1,500	.....	S	
Sinclair Prairie Oil Co., Winfield	150	.....	S	
Total	7,400	500		

KENTUCKY

Bowling Green Ref. Co., Memphis Junc.	1,500	.....	S	
Simrall Ref. Corp., Horse Cave	2,500	.....	S	
Total	4,000			

LOUISIANA

Acme Ref. Co., Monroe	100	.....	S	
Akin Ref. Co., Shreveport	250	.....	S	
Pelican Ref. Co., Converse	50	.....		
Total	400			

MISSISSIPPI

East Jackson Ref. Co., Jackson	50	.....	A	

MONTANA

Arro Oil & Ref. Co., Lewiston	2,000	500	C	Dubbs
B. & M. Ref. Co., Roundup	300	.....	S	
Hawley, Ted, Gallup City	100	.....	S	
Wyomont Prod. & Ref. Co., Oilmont	40	.....	S	
Yale Oil Corp. of S. Dak., Miles City	500	.....	S	
Total	2,940	500		

OHIO

Johnson, A. L., Wayne	60	.....	S	
Wayco Ref. Co., Toledo	250	.....	S	
Total	310			

OKLAHOMA

Crump Refinery, Oklahoma City	2,000	.....	S	
Electrol Ref. Co., Oklahoma City	2,000	.....	S	
Government Ref. Co., Oklahoma City	4,500	.....	S	
Government Ref. Co., Seminole	800	.....	S	
Gulf States Ref. Co., Oklahoma City	5,000	.....	S	
Illinois Oil Co., Cushing	3,000	1,500	S-C	
Triangle Prod. & Ref. Co., Oklahoma City	3,000	.....	S	
Wirt Franklin Pet. Corp., Ardmore	4,000	.....	S-A	
Yale Oil Corp., Yale	2,000	.....	S	
Total	26,300	1,500		

PENNSYLVANIA

Atlantic Ref. Co., Franklin	9,000	6,000	Comp.	Cross
Atlantic Ref. Co., Pittsburgh	8,000	4,000	Comp.	Cross
A. D. Miller Sons' Co., Pittsburgh	1,000	.....	S-L	
Tiona Ref. Co., Clarendon	1,000	.....	L-W	
Valvoline Oil Co., Warren	1,000	.....	L-W	
Wolverine-Empire Ref. Co., Inc., Tidioute	400	400	S	
Total	20,400	10,400		

TEXAS

Company and plant location—	Crude oil cap.	Cracking cap.	Type of refinery	Type of cracking plant
Acme Ref. Co., Gladewater	700	.....	S	
Allstate Ref. Co., Thrall	2,500	.....	S	
Amega Ref. Co., Brownwood	200	.....	S	
Artex Refining Co., Arp	1,600	.....	S	
Benco Ref. Co., Three Rivers	100	.....	S	
Bennett Ref. Co., Houston	2,500	.....	S	
Bluebonnet Oil Ref. Co., Wickett	2,000	800	S	
Blue Diamond Ref. Co., Gladewater	1,500	.....	S	
Central Ref. Co., Gladewater	2,000	.....	S	
Chapa Refinery, Laredo	400	.....	S	
Citizens Oil & Ref. Corp., Luling	500	.....	S	
Deep Sand Oil Co., Reeds	3,500	.....	S	
Dominant Ref. Co., Kilgore	4,000	.....	S	
Elk Ref. Co., Overton	3,000	.....	S	
Empire Oil & Ref. Co., Gainesville	5,000	2,000	S-C	Dubbs
Glade Refining Co., Gladewater	2,500	.....	S	
Hill Ref. Co., Ballinger	40	.....	S	
Johnson Ref. Co., Kilgore	1,000	.....	S	
Kent Ref. Co., Angus	2,000	.....	S	
Keystone Ref. Co., Gladewater	2,300	.....	S	
Lake Ref. Co., Gladewater	3,500	.....	S	
London Topping & Ref. Co., Overton	1,000	.....	S	
Lubbock Ref. Co., Lubbock	250	.....	S	
McKain Ref. Co., Gladewater	800	.....	S	
Macmillan Pet. Corp., Borger	7,500	.....	S	
Master Pet. Co., Waco	1,000	.....	S	
Matthews Ref. Co., Gladewater	400	.....	S	
Mid-Tex Ref. Co., Midland	200	.....	S	
Mid-Texas Ref. Co., Eliasville	400	.....	S	
New Deal Oil & Ref. Co., Abilene	750	.....	S	
Nueces Ref. Co., Banquette	800	.....	S	
Norgold Ref. Co., Olney	1,000	.....	S	
Omega Ref. Co., Brownwood	200	.....	S	
Outdoor Ref. Co., Kilgore	900	.....	S	
Overton Ref. Co., Overton	3,000	.....	S	
Panama Ref. Co., Kilgore	3,000	.....	S	
Paramount Refineries, Inc., San Angelo	2,000	.....	S	
Pilot Point Ref. Co., Pilot Point	500	.....	S	
Price Ref. Co., San Antonio	500	.....	S	
Producers Oil & Ref. Co., Kilgore	3,000	.....	S	
Richardson Ref. Co., Big Spring	7,500	.....	C	Jenkins
Royal Oil & Ref. Co., Kilgore	3,000	.....	S	
Rusk Oil & Ref. Co., Overton	4,000	.....	S	
Sabine Ref. Co., Longview	1,000	.....	S	
Samuell, J., Howard, Refinery, Coleman	100	.....	S	
Saxet Ref. Co., Gladewater	1,000	.....	S	
Smith Ref. Co., Gladewater	1,500	.....	S	
Southland Ref. Co., Megargel	700	.....	S	
Southland Ref. Co., Olney	750	.....	S	
State Ref. Co., Kilgore	1,000	.....	S	
Superior Ref. Co., Tiffin	2,000	.....	S	
Texas Oil Products Co., Gladewater	4,000	.....	S-C	Own
Texas-Mexican Oil & Ref. Co., Laredo	800	.....	S	
Trinity Ref. Co., Gladewater	3,000	.....	C	Lummus
Phillips, B. F., Ref. Co., Gladewater	750	.....	S	
Utah Ref. Co., Kilgore	2,500	.....	S	
View Ref. Co., Kilgore	750	.....	S	
Wabash Ref. Co., Gladewater	1,000	.....	S	
Wichita Ref. Co., Gladewater	500	.....	S	
Young, W. C., Ref. Co., Archer City	250	.....	S	
Yuba Oil Co., Nacogdoches	150	.....	S	
Total	104,090	2,800		

UTAH

Diamond Oil Co., Virgin	200	.....	S	
Jenson Oil Ref. Co., Ogden	2,000	.....	S	
Utah Parks Pet. Co., Virgin	100	.....	S	
Total	2,300			

WEST VIRGINIA

Standard Oil Co. of N. J., Parkersburg	6,000	12,500		Tube and Tank
Tri-State Ref. Co., Kenova	2,500	1,800	S-C-A	Jenkins
Total	8,500	14,300		

WYOMING

Eclipse Oil & Ref. Co., Newcastle	250	.....	S	
Fern Oil Co., Thermopolis	500	.....	S-A	
Gillette Ref. Co., Gillette	300	.....	S	
Goshen Oil & Ref. Co., Torrington	250	.....	S	
Osage Ref. Co., Osage	700	.....	S	
Pedro Refinery, Newcastle	500	.....	S	
Pilot Butte Refinery, Morton	60	.....		
Wheatland Ref. Co., Wheatland	120	.....	S	
Wyoil Ref. Co., Casper	300	.....	S	
Total	2,980			

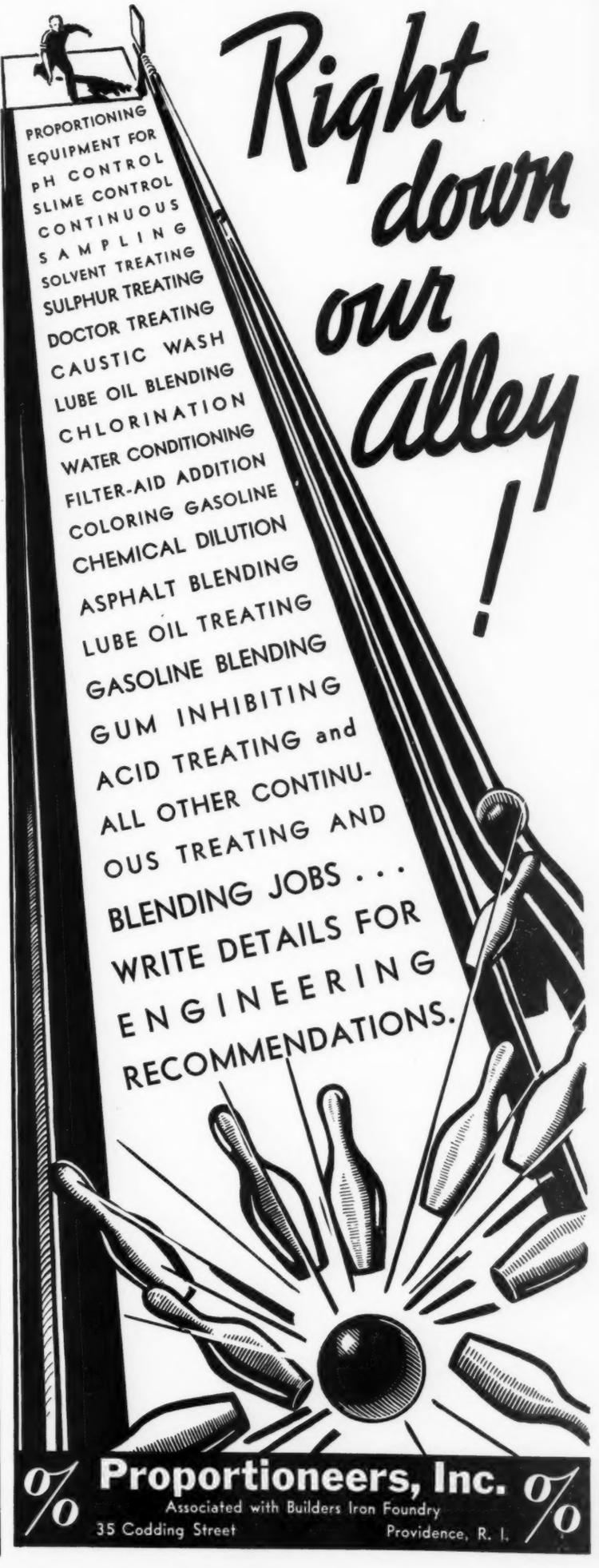
Refineries in Canada

Company and plant location—	Crude oil cap.	Cracking cap.	Type of refinery	Type of cracking plant
ALBERTA				
Bell Ref. Co., Ltd., Calgary	750	.....	S	
British American Oil Co., Ltd., Coutts	2,500	1,000	S-C	Liquid and Vapor Phase
British American Oil Co., Ltd., Turner Valley	1,000	.....	S	
Huff Ref. Co., Ltd., Lethbridge	500	.....	S	
Imperial Oil, Ltd., Calgary	5,000	4,400	S-C-A	Tube and Tank
Imperial Oil, Ltd., Coutts*	4,000	.....	S	
Lion Ref. Co., Calgary	250	.....	S	
Total	14,000	5,400		
*Shut down.				
BRITISH COLUMBIA				
Home Oil Distributors, Ltd., North Vancouver	1,000	.....	S	
Imperial Oil, Ltd., Ioco	16,000	6,800	C-L-A	Tube and Tank
Shell Oil Co. of British Columbia Ltd., Shellburn	4,500	.....	S	
Total	21,700	6,800		
MANITOBA				
Mid-West Refineries, Ltd., Dauphin	*200	.....	S	
North Star Oil, Ltd., St. Boniface	700	.....	S	
Radio Oil Refineries, Ltd., Winnipeg	1,200	.....	S	
Total	2,100			
*Under construction.				
NORTHWEST TERRITORIES				
Imperial Oil, Ltd., Fort Norman	50	.....	S	
NOVA SCOTIA				
Imperial Oil, Ltd., Imperoyal	17,000	8,000	S-C-A	Tube and Tank
ONTARIO				
British American Oil Co., Ltd., Toronto	6,000	3,000	S-C	Liquid and Vapor Phase
Burlington Refineries, Ltd., Hamilton	600	.....	S	
Canadian Oil Companies, Ltd., Petrolia	3,000	.....	Comp.	
Imperial Oil, Ltd., Sarnia	22,000	16,500	Comp.	Tube and Tank
Lloyd Refineries, Ltd., Port Credit	2,000	900	S-C	Dubbs
McColl-Frontenac Oil Co., Ltd., Toronto	5,000	3,000	S-C	Gyro
Total	38,600	23,400		
QUEBEC				
British American Oil Co., Ltd., Montreal, East	15,000	6,000	S-C	Liquid and Vapor Phase
Imperial Oil, Ltd., Montreal, East	30,000	9,000	S-C-A	Tube and Tank
La Salle Petroleum Ref., Ltd., Montreal, East	2,500	.....	S	
McColl-Frontenac Oil Co., Ltd., Montreal	16,000	7,000	S-C	Jenkins, Kellogg
Shell Oil Co. of Canada, Ltd., Montreal, East	5,000	4,000	S-C	Dubbs
Total	68,500	26,000		
SASKATCHEWAN				
British American Oil Co., Ltd., Moose Jaw	4,000	2,000	S-C	Liquid and Vapor Phase
Consumers' Co-Operative Refineries, Ltd., Regina	500	.....	S	
Hi-Way Refineries, Ltd., Regina	2,000	.....	S	
Hi-Way Refineries, Ltd., Moose Jaw	200	.....	S	
Hi-Way Refineries, Ltd., Swift-Current	200	.....	S	
Hi-Way Refineries, Ltd., Rosetown	200	.....	S	
Hi-Way Refineries, Ltd., Saskatoon	200	.....	S	
Hi-Way Refineries, Ltd., Prince Albert	200	.....	S	
Hi-Way Refineries, Ltd., Wayburn	300	.....	S	
Home Oil & Ref. Co., Ltd., Humboldt	400	.....	S	
Imperial Oil, Ltd., Regina	4,500	2,300	S-C-A	Tube and Tank
Total	12,700	4,300		

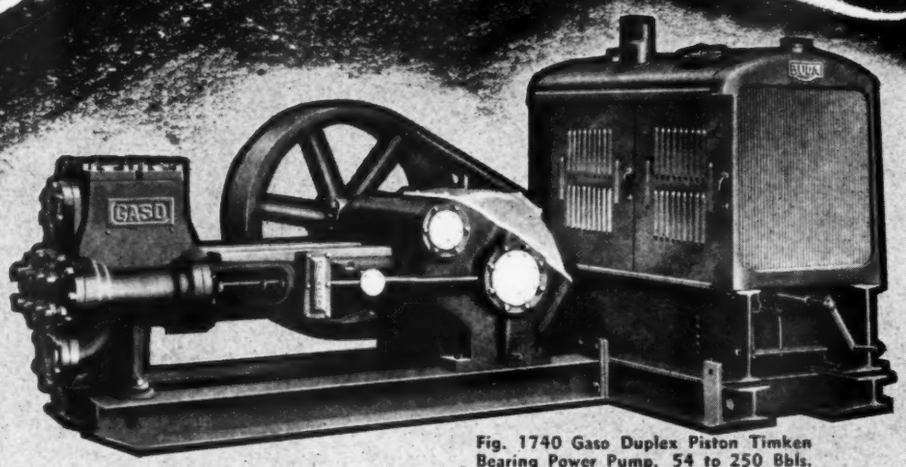
Refineries in Mexico

Compania Mexican de Petroleo "El Aguila" S.A., Tampico, Vera Cruz	50,000	4,200	S-C-A	
Compania Mexican de Petroleo "El Aguila" S.A., Minatitlan, Vera Cruz	33,000	1,200	S-C-A	
Compania Mexican de Petroleo "El Aguila" S.A., Mexico City	12,000	.....	S-A	
Huasteca Petroleum Co., Tampico	20,000	6,500	Comp.	Own
Petroleos de Mexico, S.A., Tampico, Tamps	3,000	†1,000	S	Dubbs
Pierce Oil Co., S.A., Tampico, Tamps	*16,000	.....	Comp.	
Total	134,000	12,900		

*6,000-bbl. unit under construction. †Under construction.



BEACONS



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FIELD OPERATIONS

Summarizing the Week's Developments

Notably big wells even for West Texas were reported from that district in the past week including one in Crane County, 4,756 bbls.; Ector County, 3,735 bbls.; Ward County, 2,913 bbls. and 3,272 bbls., and Winkler County, 5,395 bbls. These were the best of the Permian Basin crop which numbered 39 new oil wells. One well in Young County in the Central Texas area started at 1,550 bbls.

Two producing areas in Nueces and Bee counties, new sand production in the Seven Sisters and Saxet pools and pool extensions, featured the week in Southwest Texas.

The Texas Gulf Coast appears to have a major discovery in the Palacios area, in Matagorda County, where four distinct oil sands were penetrated in a wildcat. It had not yet been given a production test.

A recent survey in East Texas indicates an increased number of wells showing water and an increase in the volume of water. An average of 46,327 bbls. of salt water per day is being produced from 2,184 oil wells.

Seventeen of the Texas Panhandle completions yielded 10,174 bbls. initially, an average of about 600 bbls. per well.

TEX.-LA.-ARK. DIVISION

Union County, Arkansas, appears to have a new field in the making, and the discovery gives indications of being at least a 1,000-bbl. well. It is in section 18-18-17, 15 miles southwest of El Dorado and 8 miles north of the Louisiana line. The pair of important Marion County, Texas, wildcats are still in the incomplete stage. The Lodi well is flowing 305 bbls. and the Jefferson well from 7 to 10 bbls. an hour with the aid of a siphon, or jet valve. It does not flow naturally. A 67,000,000-foot gasser in Bienville Parish, Louisiana, and a 50,000,000-foot gasser in Bossier Parish were additional features.

OKLAHOMA

Outstanding strike of the year to date in Oklahoma was recorded at Eason Oil Co. and others No. 1 Smith, which flowed 1,720 bbls. of oil in 5½ hours from Wilcox sand and extended the Langston pool, Logan County, one-half mile eastward. A small pool opener was completed in Tillman County. Deep wildcat tests were started in Murray and Haskell counties.

KANSAS

Wildcats east of the Bemis pool, in Ellis County and southeast of Eldorado in Butler County, apparently opened new oil areas. Production in the Bloomer pool, Barton County, was extended across the line into Ellsworth County. The Burrton field, Reno County, was extended one-half mile westward.

ROCKY MOUNTAIN FIELDS

A Tertiary test will be drilled in Moffat County, Colorado, on the South Vermilion Creek structure. An intense leasing campaign is going on between the Lance Creek field and Douglas in Colorado. Lea County, New Mexico, had 18 completions of the usual high average initial production shown by that field.

CALIFORNIA

Definite proof of a new deep producing zone in the Rosecrans field and the extension of the El Segundo and Mountain View fields were Pacific Coastal features.

Completions in All Fields

(Week Ending March 20, 1937)

	Oil	Gas	Dry	Total	1937 total comp. to date	1936 total comp. to date
Penna. Grade Fields	78	5	3	86	815	624
Lima Field	0	0	0	0	14	12
Central Ohio	4	11	2	17	189	53
Indiana	0	0	0	0	27	34
Kentucky	2	0	1	3	28	42
Illinois	0	0	0	0	8	10
Michigan	9	0	5	14	169	155
Kansas	30	0	7	37	430	292
Oklahoma	20	2	12	34	541	491
Texas:						
North Central Texas	41	0	23	64	576	525
West Texas	39	0	4	43	517	263
Texas Panhandle	10	0	0	10	133	145
East Texas	35	0	0	35	441	579
East Central Texas	9	0	0	9	139	52
East Texas border	6	0	0	6	91	6
Gulf Coast Texas	17	1	2	20	262	229
Southwest Texas	48	5	18	71	707	536
Total Texas	205	6	47	258	2,866	2,335
North Louisiana	4	4	4	12	86	128
Gulf Coast Louisiana	7	4	6	17	107	81
Total Louisiana	11	8	10	29	193	209
Arkansas	1	0	2	3	21	22
Montana	0	0	0	0	15	22
Wyoming	2	0	3	5	22	17
Colorado	0	0	1	1	6	9
New Mexico	18	0	1	19	162	95
Utah	0	0	0	0	0	3
California	16	0	2	18	273	243
Total United States	396	32	96	524	5,779	4,668
Total previous week	388	56	124	568		
Difference	8	24	28	44		

Outstanding Fields—Highlights

(Week Ending March 20, 1937)

FIELD—	Rigs up	Wells drlg.	Weekly oil completions	Initial prod.	Total No. oil wells	Daily av. prod.
TEXAS						
Anahuac	2	7	1	611	158	14,067
Hastings	4	12	2	1,248	148	12,932
Loma Novia	2	6	3	620	669	15,480
Seven Sisters	0	6	5	2,230	385	8,500
Saxet	7	27	9	1,490	408	24,720
Lopez	3	3	2	455	300	6,730
East Texas	44	96	35	1,475	22,340	459,187
Talco	17	37	5	1,091	243	24,963
OKLAHOMA						
Oklahoma City	1	22	0	0	1,098	155,250
Fitts	7	53	4	7,098	657	92,075
Burbank-S. Burbank	1	5	0	0	2,166	23,700
KANSAS						
Ellis County	4	22	1	2,949	81	5,930
Reno County	5	30	3	1,303	379	21,280
Russell County	8	53	10	13,295	617	27,465
Rice County	10	65	8	4,044	732	44,670
NEW MEXICO						
Lea County	14	95	18	3,862	2,035	101,030
LOUISIANA-TEXAS						
Rodessa, La.	5	12	3	1,470	355	47,605
Rodessa, Tex.	8	41	6	4,177	229	44,135
Gillis, La.	1	4	1	320	57	14,782
Tepetate, La.	1	3	0	0	41	5,537
MICHIGAN						
Porter-Yost	1	8	0	0	431	13,507
Crystal-Montcalm	4	4	1	65	150	2,160

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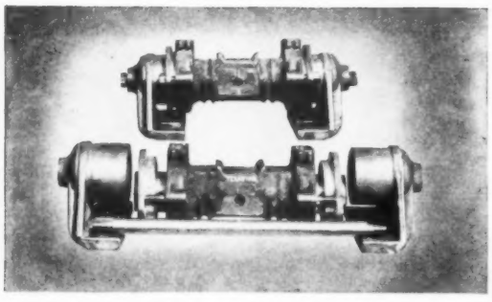

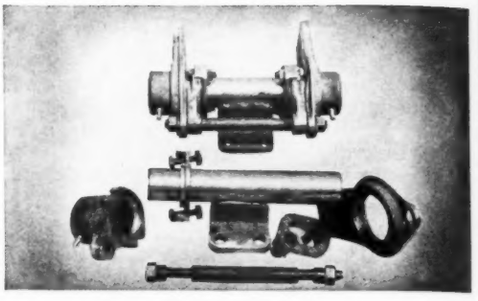

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The saddle bearing used on Jacks and backside assemblies is fully enclosed, incorporating the stuffing box oil gland principle.

A steel rod through the center bolted at each end holds the assembly in line. This permits the repacking of stuffing boxes without removing the beam. This bearing is made in three styles:

Type A. Bronze Bushed Alemite fitted, grease packed, dirt and dust proof.

Type B. Same as Type A. except not Bronze Bushed.

Type C. Machined semi-steel with packed set collar packing gland.

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These bearings have an exclusive self-alignment feature. They are simply constructed stuffing box packing gland bearings with a cold rolled steel shaft fitted into semi-steel castings separated with a large exterior bolt thus assuring ample play to prevent freezing. These bearings are made in three distinct types:

Type A. Bronze Bushed, Alemite fitted, grease packed, dirt and dust proof with stuffing box type packing gland.

Type B. Same as Type A. But not Bronze Bushed.

Type C. Machined semi-steel with a set collar packing gland.

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TEXASTEEL

Eastern Field Report

By STAFF CORRESPONDENT

RESUME WORK ON NOTABLE SOUTHWEST PENN. GAS TEST

PITTSBURGH, Pa., Mar. 22.—After months of arduous work, the deep test of William Snee and others on the Summit Hotel lease on Chestnut Ridge, in South Union Township, Fayette County, Pennsylvania, is about ready to be drilled into the gas formation found in the old hole. After setting 7-inch casing to the bottom of the Tully lime at 6,100 feet, rapid progress was made during the week and the tools reached the Onondaga lime at 6,583 feet. Here drilling was suspended to cement the 8-inch casing and to run the cement-spray bailer in the bottom open hole.

After this work is completed, the present plans are to drill to the gas pay, which was found at 6,611 feet, to determine just what is there. In the old hole, at that depth, the volume of gas reached in excess of 500,000 feet a day before the hole bridged over below 5,200 feet, and it was found impossible to run casing due to the crooked hole. In the present test, the old hole was left at about 4,250 feet and drilling was then done with a spiral bit and stem, and in addition, caving was greatly lessened in the latter stages of the hole by the cement-spray bailer.

In the old hole, it was not determined just what the thickness of the Onondaga was, but from petrographic studies, the tools were 30 feet in the Onondaga when gas was struck, and the lime was changing color. The gas found was sweet and by chemical analysis totally different from that in the Oriskany gas pool in Kanawha County, West Virginia.

The outcome of this test is of high importance as it is located on a huge structure miles distant from any gas well, and the most eastern gas from the Devonian series in the lower fields.

SOUTHEAST OHIO

Bell Oil Co. on the Sadie R. Seidenfeld farm in the NE quarter of section 36, Coal Township, was drilled in the Clinton sand, total depth 3,715 feet, and produced 40 bbls. the first day after shot.

In Carroll County, the Hannum Oil & Gas Co. completed a test on the W. S. Wilson farm in section 1, Washington Township, in the Berea sand at a depth of 1,257 feet. It produced 3 bbls. the first day after shot.

In Licking County, the Wehrle Co. completed a test on the John Murphy farm in section 13, Licking Township, in the Berea sand at 750 feet. It produced 4 bbls. the first day after shot. In section 1, Franklin Township, the Ohio Fuel Supply Co. drilled a test on the W. H. Gutridge farm through the Clinton sand to a total depth of 2,693 feet. It was a dry hole.

SOUTHWEST PENNSYLVANIA

In Center Township, Greene County, Pennsylvania, the Carnegie Natural Gas Co. completed a second test on the J. W. Milliken farm at 3,184 feet. It produced 105 bbls. the first day. The Nineveh Thirty Foot sand was at 3,154 feet with gas at 3,163 feet and again at 3,167 feet which totaled 37,000 feet a day. At 3,180-82 feet was the oil pay. This well is in direct line with the fair producer on the Mattie I. Scott farm and the Charles Harvey lease production to the north. On this lease, the South Penn Oil Co. is down 1,490 feet in the No. 10, and Charles Mong and others have spudded in on the J. L. Metz lease.

In Dunkard Township, Greene County, Carnegie Natural Gas Co. completed the test on the Dale Brand farm at a depth of 2,010 feet. The Big Injun sand topped at 1,868 feet showed gas totaling 53,136 feet a day at 1,969 feet and 94,080 feet at 1,987-90 feet. It will be shot. Here, this company is down 2,742 feet on the Ella B. Parker farm.

In Richhill Township, Greene County, Natural Gas Co. of West Virginia has a location on the O. M. Grinnage farm. In Wayne Township, the Equitable Gas Co. is down 3,129 feet deepening No. 1 E and M. Cole.

In Springhill Township, Greene County, Union Gasoline & Oil Corp. has reached 500 feet on the Lloyd Strope farm. The Penn-Ohio Oil & Gas Co. is down 2,525 feet deepening the No. 2 on the H. H. Milliken farm.

In Amwell Township, Washington County, the Manufacturers Light & Heat Co. will deepen No. 1 Ella Johns. Union Gasoline & Oil Corp. has started deepening No. 5 A. O. Vankirk from 2,087 feet, and is down 2,365 feet. Carnegie Natural Gas Co. is drilling at 1,686 feet on the N. B. Redd farm. The Union Gasoline & Oil Corp. has reached 2,160 feet on the C. H. Miles farm.

In South Franklin Township, Washington County, the Dunn Mar Oil & Gas Co. is drilling at 1,650 feet on the J. T. Baldwin farm. The first gas sand was at 1,468-90 feet with about 200,000 feet of gas at 1,472 feet which blew down to 50,000 feet a day. The Carnegie Natural Gas Co. reached 1,174 feet on the C. T. Dodd farm and shut down to change engines.

In Morris Township, Washington County, the Manufacturers Light & Heat Co. is drilling at 1,730 feet on the W. E. Craft farm. In Amwell Township, the South Penn Oil Co. is spudding in No. 4 on the J. Q. Zimmerman farm.

In Peters Township, Washington County, the Carnegie Natural Gas Co. is spudding No. 2 Douglass. R. M. Duden and others have reached 1,020 feet on the McDowell heirs farm. Henderson & Co. are down 1,100 feet on the Bell heirs farm.

Deep Tests

In Franklin Township, Butler County, 1 mile south of Prospect, the deep test of the American Natural Gas Co. and the T. W. Phillips Gas & Oil Co. on the Perry S. Davis farm is ready to resume drilling. After the hole was cleaned out, the tools were recovered, total depth 5,295 feet. There is still a rope socket in the hole and work is progressing slowly.

In Independence Township, Beaver County, the deep test of the Laughner Oil & Gas Co. and the American Natural Gas Co. is drilling 80 feet in the Corniferous lime at 5,217 feet and work is progressing smoothly.

In Mount Pleasant Township, Washington County, the deep test of Norwood Johnston and others on the James McBurney farm continues to make progress. Drilling is being done with a 5-inch pilot hole which is then reamed out to bottom to 10-inch and the cement spray bailer run. The present depth is 6,075 feet.

In Westmoreland County, the test of the Potter Development Co. on the Indiana Saving Bank farm in Fairfield Township, is also making hole. After changing the bull shaft, drilling was resumed and is past the 6,800-foot level.

WEST VIRGINIA

Two small producers were completed in West Virginia. In Ritchie County, F. R. Ball and others No. 3 Strickler heirs is a 2-bbl. well from the Keener sand at 1,965 feet.

In Grant district, Ritchie County, Dr. E. D. Moyers completed a test on the Harry Andrews farm at a depth of 1,868 feet and it is showing for a half barrel a day and 10,000 feet of gas. In Clay district, John Trexler and others on the W. S. Corbin farm, drilled through Keener sand at 1,736 feet, and it is a gas well gauging 128,000 feet a day.

In Wetzel County, C. B. Lewis and others on the Joseph Blatt, Jr. heirs farm in Proctor district drilled to 2,106 feet. It was dry in the Maxon sand. The Pittsburgh Coal was found at 1,084 feet.

In Wood County, the Tri-State Oil Co. on the Jacob Bauers farm in Union district drilled through Injun sand at 1,854 feet and got a dry hole.

Oriskany Field

A road is being built to a location for the most westerly deep test in the present Oriskany field in Kanawha County. In Union district, Godfrey L. Cabot, Inc. made a location on the Sarah Ann Null farm about 2½ miles west of the G. W. Facemyer Oriskany gas well.

In Elk district, Kanawha County, 1¼ miles due east of the W. T. Copen dry hole and 1 mile north of the C. B. Graham gas well, Hays Oil & Gas Co. made a location on the Leon Williams farm. In this district, the Columbian Carbon Co. has made a location on the Robert N. Orth farm just east of the Grant Copenhaver farm. A location in the same district for a test on the Octavia Pauley farm one-half mile west of the Henry A. Walker gas well. The elevation is 827 feet.

In Poca district, Kanawha County, United Carbon Co. made a location on the E. M. Burdette and others lease one-half mile north of the W. P. Moss well. This test will be on the outskirts. In this district, G. W. Lepeire reached the top of the Corniferous lime at 4,674 feet on the J. W. Legg farm, and is drilling at 4,688 feet. The Columbian Carbon Co. is drilling at 4,250 feet on the B. R. Reed farm and 1,150 feet on the Mary Boggess farm. The United Fuel Gas Co. is down 560 feet on the A. J. Bruen and others No. 4,712. The Hays Oil & Gas Co. has reached 1,580 feet on the E. C. Humphrey farm.

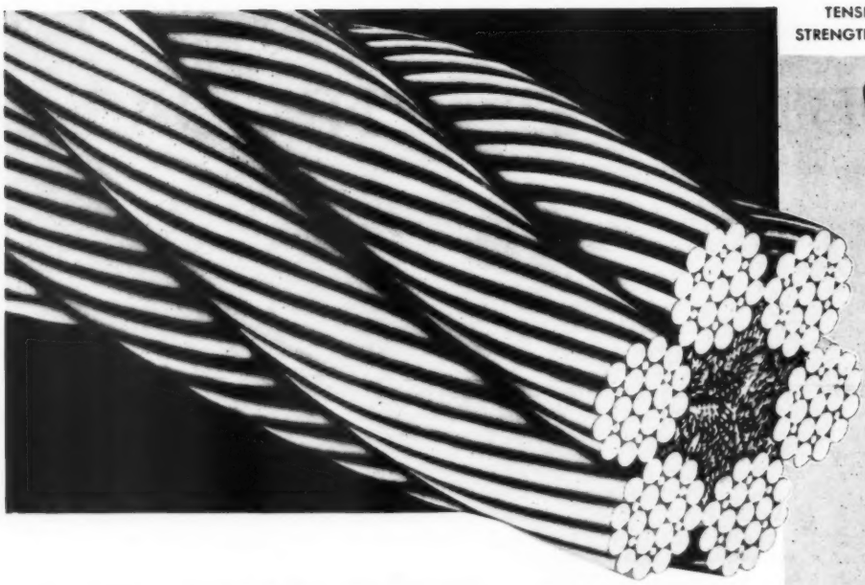
The final depth of the Mullins Gas Co.'s test on the J. F. Corke farm southwest of the Facemyer well in Poca district was 4,918 feet, and the gauge 9,600,000 feet a day, with a rock pressure of 1,830 feet, which makes it the equal of the Facemyer well.

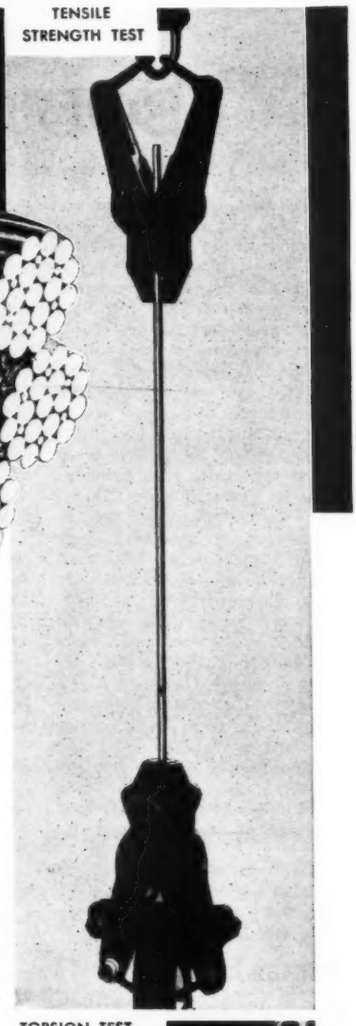
In Elk district, Kanawha County, Columbian Carbon Co. reached the top of the Corniferous lime at 4,886 feet on the Ida Hughart farm and is shut down for casing. This company is drilling at 2,975 feet on the J. C. Gordon farm; 4,024 feet on the James R. Jones farm; 2,719 feet on the Minia F. Stauffer farm and 1,463 feet on the W. L. Burdette farm. It is also building rig on the R. L. Wolfe farm and rigged up on the John Summers, Jr. farm.

In this district, the United Fuel Gas Co. is drilling at 1,075 feet on the C. B. Graham No. 4,706 and 2,980 feet on the Mollie Shafer and others No. 4,710. Benebum & Trees are in the Oriskany sand in the test on the Mary Slack farm south of the Wingfield gas well and it may not make a gas well. Their test on the T. W. Walls and others lease is down 2,490 feet. The United Carbon Co. has spudded in the H. C. Smith test. The Glenn Oil & Gas Co. has reached 2,350 feet in the No. 2 on the Virginia Joint Stock Land Bank.

Outside Deep Tests

An interesting note comes from the deep test





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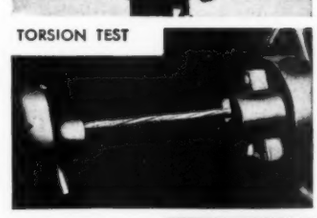

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UNITED STATES STEEL

of Godfrey L. Cabot, Inc. on the T. F. Smith farm on the west flank of Chestnut Ridge near the town of Uler in Geary district, Roane County. This well was dry and making some water. After several weeks waiting to plug the hole, it was found that the salt water has risen 3,000 feet in the hole. This operator's test on the Allen Hardman farm on the Arches anticline west of Grantsville in Center district, Calhoun County, which was fishing, is now cementing after recovering the tools. The bottom had been at 5,846 feet and it will be cemented back 100 feet.

In Burning Springs district, Wirt County, this operator's deep test on the Walter Hoffman farm is drilling at 5,160 feet and will shut down to cement.

New Work

In Boone County, the South Penn Oil Co. has a location for No. 38 Yawkey-Freeman in Washington district. In Cabell County, Kentucky-West Virginia Gas Co. has a location for a test on the N. B. Morrison farm.

In Calhoun County, the Simmons Gas Co. has a permit for No. 4 H. G. Brannon and others, in Lee district. The Hope Natural Gas Co. has a rig up for No. 3 McIntyre Rafferty farm in Sherman district.

In Clay County, the Hope Natural Gas Co. has a location for No. 2 on the Mary Weatherall Estate in Pleasant district. In Henry district, the South Penn Oil Co. has started drilling the No. 9 on the James Phillips farm.

In Gilmer County, J. A. Rusmiser has the rig standing on the W. V. Gainer farm in DeKalb district. The Oil City Trust Co. has started deepening the former Salt sand gas well on the O. C. and T. C. McQuain farm in DeKalb district.

In Harrison County, the Eagle Gas Co. made a location on the Stanley Boggess (Lancaster lease) in Eagle district. The elevation is 989.5 feet and is on Reeses Run.

In Lincoln County, the United Fuel Gas Co. made a location on its own property in fee in Carroll district. In Lewis County, L. M. Cain and others have a rig up on the John Turner farm, in Court Houst district.

In Nicholas County, the Hope Natural Gas Co. made a location on the C. & H. Corp. farm in Jefferson district, elevation 1,500 feet, and a location on the Federal Coal Co. lease, elevation 1,526 feet.

In Wetzel County, Carnegie Natural Gas Co. has a location for No. 2 Clarence Blatt in Proctor district. In Wirt County, Septer W. Douglas will drill No. 6 Al Blankenship in Spring Creek district.

Michigan Field Report

THREE BUCKEYE WELLS GOOD FOR 5,283 BARRELS INITIALLY

By PAUL A. ELLIOTT

ANN ARBOR, Mich., Mar. 22.—The Buckeye Township, Gladwin County, field, despite a reduction of 2½ cents a barrel in the price of its crude announced last week by two major purchasers, continued to lead Michigan in new oil production with four wells making nearly 5,000 bbls. of the approximate 6,500 bbls. of new initial.

The Clayton Township, Arenac County, and Sherman Township, Isabella County, fields, shared the limelight again, as they have during the past few months, with the Crystal-Montcalm field adding one and Ogemaw field adding two smaller oil producers. Five dry holes and one abandoned hole completed the record of the week totaling 15 completions.

Buckeye—Gladwin

Mammonth Producing & Refining Corp. completed two large wells in the Buckeye-Gladwin field, No. 1-B State, SW SE SE section 11-18n-1w, making 2,283 bbls. daily, from Dundee at 3,550-3,620 feet, and the No. 2-A State, NW NE NW section 14, adding 1,800 bbls. initially.

Marshall H. Bauman No. 1 State, SW NE SE section 2, same township, was drilled into the Dundee for an initial flow of 60 bbls. an hour and an estimated 24-hour production of 1,200 bbls.

Bauman No. 1 Wager, NE SW NW section 14, Buckeye Township, made 50 bbls. naturally, but was expected to be doubled by acid treatment. The Rowmor Corp. No. 1 State, NW NW NE section 36, brought in the previous week with an estimated initial of 40 bbls., was increased to 69 bbls. daily by acidizing.

Clayton—Arenac

In Clayton Township, Arenac County, McClanahan Oil Co. No. 3 Seignious, SW SW SE section 3-20n-4e, third producer on the discovery lease, flowed 160 bbls. daily, while the Devonian Oil Co. hit 225 bbls. a day in No. 1 Frank Peavy, NE SW SE section 4, same township.

Sherman—Isabella

The Rowmor Corp. No. 1 Leiter, NE NE SW section 33-15n-6w, Sherman Township, Isabella County, was increased from an estimated initial of 400 bbls. the previous week to over 700 bbls. after acid treatment.

The Fortney Oil Co. finally gave up trying to make a commercial producer of No. 1 Battle, NW NE SW section 26-16n-4w, in Vernon Township, Isabella County. Two others were near completion, one treating a Dundee show.

Two tests were dry, namely, Pure Oil Co. No. 1-A Woodin, SW SE NW section 27, drilled to 3,720 feet, and the Charles Strange No. 1 State, SW SE SE section 34, same township.

Ferris—Montcalm

Burnstein Oil & Gas Corp. completed No. 4 Keel, NW NE SE section 35-11n-5w, Ferris Township, Montcalm County, for 65 bbls. daily in Dundee, topped at 3,214 feet and drilled less than a foot into the limestone.

Ogemaw County

Two small producers were added to the Ogemaw County record, Newell & Woughter completing No. 1 Swain, NE SW SE section 19-22n-2e, West Branch Township, making 50 bbls. a day and the H. C. Nelson No. 5 State, NW SW SW section 31-22n-3e, Churchill Township, producing lightly from the Traverse and the operator considering deepening to the Dundee.

Dusters

Three wildcat tests, two of them in counties where production has been encountered, were dry and abandoned.

Jetter Development Co. struck water in No. 1 Eckert, NE NW SW section 12-9n-6w, Bushnell Township, Montcalm County, latest unsuccessful attempt to develop a commercial field in the Vickeryville area.

The R. B. Tamblyn No. 1 Cashion and others, NW NW NE section 25-18n-13w, Webber Township, Lake County, topped the Dundee in a rank wildcat at 3,069 feet, but struck black water at 3,080 feet and was to be abandoned.

Cryden Petroleum Co. was forced to skid rig and abandon No. 1 Gary, NW NE NE section 34-19n-1w, Gladwin Township and county wildcat extension test.

Smith Petroleum Co. No. 1 Brink, SW NE NW section 23-14n-7e, Akron Township, Tuscola County, struck a show of oil at 2,838 feet, but was drilled 30 feet deeper into the Dundee without success and probably will be abandoned as a dry hole.

New Locations

In a list of 18 new permits issued by the state conservation department, 10 were for additional tests in Buckeye Township, Gladwin County, where more than 70 projects are now active, two were for tests in proved Midland County areas, three for Sherman and Lincoln Township tests in Isabella County, near proved territory in the Sherman Township field and one each for proved areas in Ogemaw, Muskegon and Winfield Township, Montcalm County.

Geologists Meet

One hundred years of scientifically sound, yet friendly, human service to the Commonwealth of Michigan, during a history only 28 days younger than the state itself, was commemorated here Saturday at the anniversary dinner of the Michigan Geological Survey in the Michigan Union Building.

Attended by about 120 state, university and commercial geologists, gathered with guests to pay tribute to the Survey founded Feb. 23, 1937, the dinner was the closing event of the most successful annual meeting of the geology and mineralogy section of the Michigan Academy of Science, Arts and Letters.

The after-dinner program, presented as "An Animated Review of the First Hundred Years," was featured by tributes to Dr. Douglas Houghton, first state geologist and a man who was once offered the presidency of the university, Dr. A. C. Lane, of Tufts College, Boston, former Michigan state geologist from 1899 to 1909, and Dr. R. A. Smith, present state geologist and head of the Survey for the past quarter century.

Honoring in spirit the first state geologist, Miss Helen Martin, of the Survey staff, Lansing, one of three women geologists in Michigan, presented Franklin Houghton Morgan, of Detroit, great grandson of Douglas Houghton, and his children, Rolland and Helen Margaret Morgan, of Leslie, great, great grandchildren.

Miss Martin, who is compiling an extensive history of the Survey to be published next fall, told the story from 1937 through the administrations of six of the state's nine geologists bringing it up to the appointment of Dr. Lane, who spoke on "The Last 50 Years."

Dr. Lane presented Arthur Seaman, of Houghton as "the man who knows more about the geology of Michigan than any other," and recalled the early days of his own administration when coal was discovered at Saginaw and he predicted the occurrence of oil and gas at Saginaw and Muskegon.

(Continued on Page 214)

Kansas Developments

By
DAL DALRYMPLE

WILDCATS IN ELLIS, BUTLER COUNTIES OPEN NEW FIELDS

An important wildcat strike in Kansas was recorded in Ellis County at Lario Oil & Gas Co. No. 1 Cress, NE cor. section 13-11-17w, northeast of Hays. It topped Siliceous lime at 3,293 feet and at 3,302½ feet, total depth, 3,150 feet of oil rose in the hole in three and one-half hours. Later, it pumped 1,208 bbls. of oil naturally in 14 hours and appears to be good for 2,000 bbls. a day, naturally. It is 3½ miles east of the Bemis pool.

The Bloomer pool of Barton County was extended eastward across the line into Ellsworth County at Gulf Oil Corp. No. 1 Grizzell, in section 21-17-10w. Oil rose 3,000 feet in the hole in three hours from Siliceous lime at 3,255 feet. Operators planned to core 3 feet deeper before making production test. Showing in this well strengthens the belief of oil men that the prolific Bloomer pool will be extended over a wide area to the east and southeast.

The Burrton field of Reno County was extended one-half mile west, across the Arkansas River, at Sinclair Prairie Oil Co. No. 1 Kaufman, SW SW SE section 18-24-4w, with a 3,500-bbl. well.

Former Governor A. M. Landon apparently has opened a new pool in southeastern Butler County at his No. 1 McCaig, NE NE SE section 13-28-6, about 15 miles south and 8 miles east of El Dorado. Oil rose 1,000 feet in the hole after Bartlesville sand was topped at 2,720 feet and drilled to 2,739 feet. It is estimated good for 100 bbls. of oil daily after shooting. It may prove a southwest extension of the Keighley pool. Mr. Landon has a block of about 1,400 acres in the vicinity.

Barbara Oil Co. No. 1 Holmes, SE NE section 15-33-13w, southwest of the Medicine Lodge gas field, Barber County, flowed an estimated 40 bbls. of oil an hour, with 10,000,000 feet of gas, when opened for a short test. Oil production was from Viola lime at 4,847 feet, with the gas said to be from Mississippi lime. C. B. Shaffer, head of the Barbara company, ordered the well shut in until another can be completed at No. 1 Root, C W half NW section 14-33-13w, northeast of the Holmes. If it is an oil producer, pipe line connections will be sought. The Shaffer interests own most of the acreage in the district.

Russell County

One-half of the 10 completions in Russell County were in the Trapp field. W. I. Southern, Inc. No. 2 Neidens, SE NW NE section 32-15-13w, topped Siliceous lime at 3,332 feet; total depth, 3,336 feet; acidized and made potential of 2,691 bbls. of oil. Same operator's No. 6 Sellens heirs A, SW SE SW section 30-15-13w, was acidized and made potential of 2,420 bbls. It topped Siliceous lime at 3,261 feet and was bottomed at 3,266 feet.

Coralena Oil Co. No. 7 Boomhower, SW NE NW section 32-15-13w, had Siliceous lime at 3,279-81 feet, total depth, and made potential of 2,546 bbls. Phillips Petroleum Co. No. 4 Hoffman, NW NW SE section 31-15-13w, made potential of 2,667 bbls. of oil after acidizing Siliceous lime at 3,303-11 feet, total depth. Shell Petroleum Corp. No. 7 Michaelis, SE SW NE section 31-15-13w, had Siliceous lime at 3,319-24 feet, total depth, was acidized and made potential of 2,394 bbls.

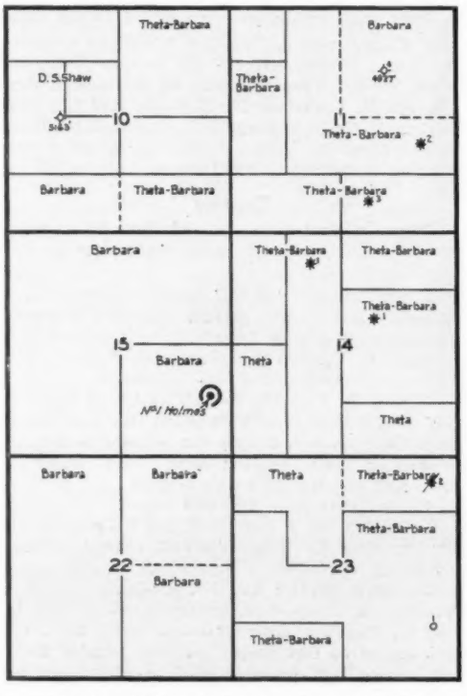
In the Gorham-Sullivan area, Bridgeport Machine Co. No. 3 Mills, SW SE SE section 33-13-15w, had Granite Wash at 3,305-15 feet; total depth, 3,330 feet, and made potential of 306 bbls. of oil. Texas Co. No. 6 Anchutz, NE NE SW section 1-14-15w, topped Kansas City lime at 3,036 feet; total depth, 3,125 feet; acidized and made potential of 315 bbls. of oil; reacidized, and made new potential of 839 bbls. of oil, with 40 bbls. of water. Empire Oil & Refining Co. No. 13 Crawford, SW NE SW section 2-14-15w, had Gorham sand at 3,300-04 feet, total depth, and made potential of 1,128 bbls. of oil.

In the Fairport pool, Central Petroleum Co. No. 3 Rusch A, SW SE SW section 19-12-15w, made potential of 646 bbls. of oil after acid treatment. Top of Kansas City lime was 3,023 feet; total depth, 3,080 feet.

Saco Oil Co. No. 2 Gurney, NE SW SW section 23-14-14w, Gurney pool, was bottomed at 3,058 feet; plugged back to 2,985 feet and acidized. It made potential of 388 bbls. of oil in 24 hours; reacidized and made new potential of 635 bbls.

First reports of new activity in Russell County: Shell Petroleum Corp. No. 1 Smith, NW NW NE SW section 31-13-14w, location; Darby Petroleum Corp. No. 1 Dumler E. NE SE NW section 36-14-15w, building rig; W. I. Southern, Inc., No. 5 Boomhower A, NE SE NE section 30-15-13w, location; same operators' No. 6 Michaelis, SW NE NW section 31-15-13w, location; Gulf Oil Corp. No. 1 Hoffman, NE NE SW section 31-15-13w, building rotary rig.

Empire Oil & Refining Co. No. 8 Ehrlich, SE SW SE section 28-13-14w, topped Siliceous lime at 3,297 feet; total depth, 3,307 feet; acidized with 3,000 gallons and pumped 550 bbls. of oil, with 16 per cent water, in 14 hours. British American Oil Producing Co. No. 2 Boxberger, NW NE NE section 33-13-14w, topped Siliceous lime at 3,268 feet; total depth, 3,271 feet; and oil rose 1,000 feet in the hole in 20 hours. National Refining Co. No. 2 East Reinhardt A, SW NW NE section 36-14-15w, had pay at 3,168-75 feet; total depth, 3,179 feet; and oil rose 1,700 feet in the hole in 12 hours. Skelly Oil Co. No. 3 John Neidens, NE SW NE section 32-15-13w, had Siliceous lime at 3,333-38 feet, total depth, was shot and acidized, and swabbed 90 bbls. of oil in three hours. W. I. Southern, Inc., No. 4 Boomhower, SE SE NW section 32-15-13w, was bottomed at 3,314 feet, acidized with 4,000 gallons, and was waiting on results. Empire Oil & Refining Co. No.1 Michaelis, C N half N half SE section 27-15-14w, total depth, 3,372 feet; acidized with 2,000 gallons, and pumped 161 bbls. of oil in 24 hours; reacidized with 3,000 gallons and was waiting.



Barbara Oil Co. No. 1 Holmes, section 15-33-13w, west of the Medicine Lodge gas area, found oil in Viola lime.—(Mid-Continent Map Co., Wichita)

Estimated Daily Production

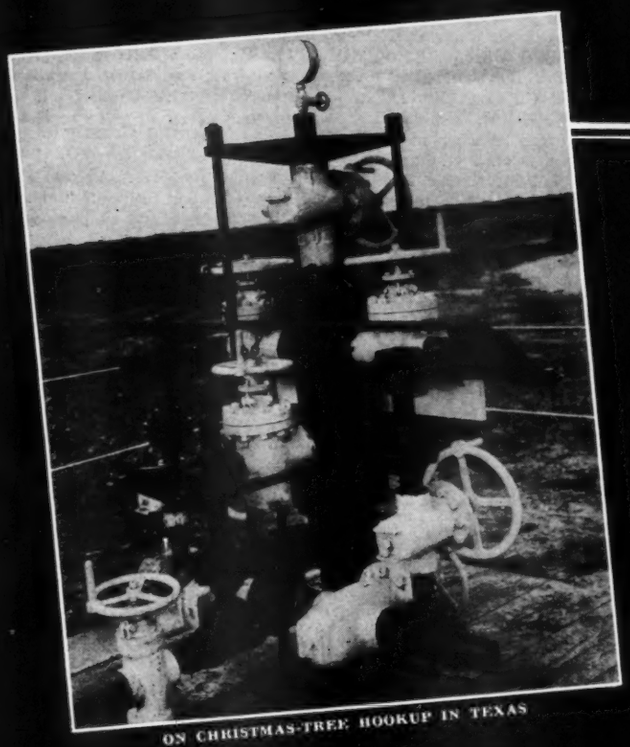
Estimated daily average production of Kansas for the week ending March 20, and for the preceding week, was as follows:

	Barrels	
	Mar. 20	Mar. 13
Oxford City	2,700	2,675
Burrton	16,725	16,375
Ritz-Canton	5,400	5,475
Graber	2,300	2,325
Hollow-Nikkel	4,075	4,100
Voshell	2,975	3,000
Wellington	2,825	3,150
Ellsworth County:		
Lorraine-South Lorraine	5,700	5,150
Other pools	1,105	1,340
Rice-Barton counties:		
Bloomer	2,750	2,850
Chase	8,250	10,300
Geneseo	2,175	2,000
Raymond	3,150	2,375
Silica	18,000	15,225
Keesling	2,275	1,925
Hauschild	3,325	4,225
Miscellaneous Rice	7,495	6,775
Miscellaneous Barton	5,530	5,150
Russell County:		
Fairport	2,715	2,315
Gorham-E. Gorham	3,350	3,280
Russell	3,660	2,530
Sullivan	5,515	5,415
Trapp	6,005	6,285
Miscellaneous Russell	6,220	5,640
Sedgwick County:		
Valley Center	1,310	1,335
Greenwich	1,285	1,295
Miscellaneous Sedgwick	2,135	2,180
Ellis County:		
Bemis	4,100	3,775
Miscellaneous Ellis	1,830	1,225
Kingman County	845	825
Stafford County	2,910	2,875
Greenwood County	9,250	9,250
Butler County	17,800	17,600
Other fields	22,640	23,035
Total Kansas	188,325	183,275

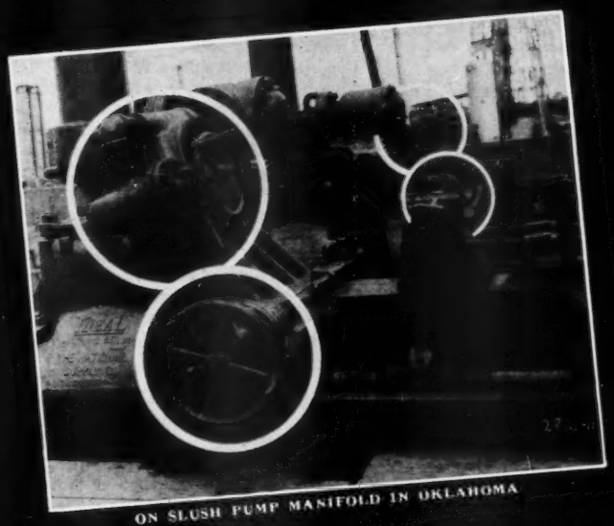
Rice County

Largest completion in Rice County was L. E. Douglass No. 3 Theede, NW SW SW section 9-21-7w, Hauschild-Saxman area. It topped Conglomerate at 3,357 feet; had pay at 3,365-80 feet, total depth; flowed 740 bbls. of oil in 3 hours and 15 minutes and made potential of 4,124 bbls. Westgate-Greenland Oil Co. and others No. 1 Johnson, NE SE NE section 17-21-7w, made potential of 1,899 bbls. of oil from Conglomerate at 3,366 feet; total depth, 3,385 feet. Atlantic Refining Co. No. 1 Goosman, NE NE SE section 8-21-7w, topped Conglomerate at 3,343 feet; total depth, 3,374 feet; plugged back to 3,368 feet, pumped 97 bbls. of oil in six hours and made potential of 367 bbls. Cromwell & Lewis No. 2 Hennekratt, NE SE SW section 8-21-7w, topped Conglomerate at 3,342 feet; total depth, 3,362 feet; shot and pumped 15 bbls. of oil in 24 hours.

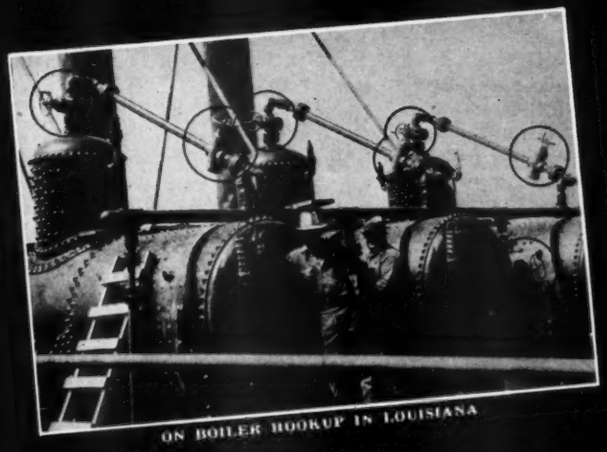
In the Silica field, Bradley Oil Co. No. 4 Mitchell, NW SE SW section 32-19-10w, pumped 650 bbls. of oil in 13 hours and made potential of 1,349 bbls. Top of Siliceous lime was 3,308 feet; total depth, 3,312 feet. Gulf Oil Corp. No. 3 Wendell, SW NW SE section 32-19-10w, topped Siliceous lime at 3,296 feet; total depth, 3,311



ON CHRISTMAS-TREE HOOKUP IN TEXAS



ON SLUSH PUMP MANIFOLD IN OKLAHOMA



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feet; acidized, pumped 392 bbls. of oil in 10 hours and made potential of 1,160 bbls., down five hours in 24 hours.

Phillips Petroleum Co. No. 1 Oberle, NW NE SE section 18-20-10w, in the Wenke pool, topped Siliceous lime at 3,285 feet; total depth, 3,295 feet; swabbed 150 bbls. of oil in 18 hours; acidized, and made potential of 600 bbls.

In the Orth area, Skelly Oil Co. No. 2 Volkland, SW SE NW section 27-18-10w, had Quartzite at 3,153 feet; total depth, 3,186 feet; swabbed 122 bbls. in 20 hours; acidized; pumped 101 bbls. of oil, with 10 per cent water, and then made potential of 135 bbls.

New work in Rice County: M. D. Scruggs No. 1 Bolton, SE SE NW section 31-18-7w, location; Hinkle and others No. 2 Schoenig, SW SE SE section 21-18-10w, cellar; Shell Petroleum Corp. and others No. 3 Tobias, SW SW NE section 6-19-9w, cellar; Stanolind Oil & Gas Co. No. 7 Mitchell, SW NE SW section 32-19-10w, building rotary rig; same company's No. 8 Mitchell, SE NE SW section 32-19-10w, building rotary rig; Gulf Oil Corp. No. 15 Stolz, Jr., NE SE NW section 5-20-10w, drilling at 185 feet; same operator's No. 16 Stolz, Jr., SE SE NW section 5-20-10w, rotary rig; Atlantic Refining Co. No. 1 Gossman B, NW NE NW section 8-21-7w, rigging up rotary.

Empire Oil & Refining Co. No. 9 Janssen A, SW NE NE section 3-18-8w, topped Siliceous lime at 3,253 feet; total depth, 3,272 feet; and had 200 feet of oil in the hole. Gulf Oil Corp. No. 11 Stolz, SW NW NW section 32-19-10w, swabbed 202 bbls. of oil in six hours after treating with 3,000 gallons of acid; total depth, 3,292 feet. Same operator's No. 4 Wendel, SE NW SE section 32-19-10w, topped Siliceous lime at 3,279 feet; total depth, 3,291 feet, and swabbed 146 bbls. of oil in four hours. Same operator's No. 5 Knop, SW NE NW section 33-19-10w, was bottomed at 3,290 feet and swabbed 72 bbls. of oil in four hours. Gulf Oil Corp. No. 12 Stolz, Jr., SW NE NW section 5-20-10w, swabbed 369 bbls. of oil in six hours at 3,303 feet, total depth, and was waiting after acidizing with 1,000 gallons. Stanolind Oil & Gas Co. No. 12 Specht, NW NW SE section 6-20-10w, was bottomed at 3,329 feet; swabbed 10 bbls. of oil an hour; acidized with 2,000 gallons and was waiting. Gulf Oil Corp. No. 1 Gossman, SW NW SE section 8-21-7w, had a hole full of oil at 3,371 feet, total depth. Sage and others No. 2 Gossman, NW SW NW section 9-21-7w, topped Conglomerate at 3,364 feet; standardized at 3,366 feet, and made potential of 3,194 bbls. of oil.

Barton County

C. B. Davis and Gulf Oil Corp. No. 6 Steckel, NE SE SE section 1-20-11w, Barton County sector of the Silica field, had Siliceous lime at 3,265 feet; total depth, 3,284 feet, and made potential of 1,653 bbls. of oil.

In the Peter pool, Magnolia Petroleum Co. No. 3 Roetzel, NW SW NE section 24-20-11w, pumped 1,155 bbls. of oil naturally in 24 hours; was treated with acid and made potential of 1,491 bbls. Top of Siliceous lime was 3,260 feet; total depth, 3,258 feet. Indian Territory Illuminating Oil Co. No. 2 Peter, NE SE NW section 24-20-11w, had Siliceous lime at 3,242 feet; total depth, 3,253 feet; and made potential of 1,449 bbls. of oil.

Hutchinson Oil & Gas Co. No. 1 Wendel, NE cor. section 13-19-11w, wildcat; topped anhydrite at 785 feet; Kansas City, 3,044 feet; Siliceous lime, 3,346 feet; had a hole full of water at 3,373-78 feet, total depth, and was dry and abandoned.

C. L. Carlock No. 1 Ehly, NE NE SE section 5-18-11w, was a rig for a new wildcat in Barton County. It is west of Claflin and north of the Feist area. Transwestern Oil Co. No. 2 Meyer, NE SE NE section 13-17-11w, was moving in material.

Texas Co. No. 5 Moran, SW SE SW section 25-17-11w, had pay at 3,316-24 feet, total depth, and oil rose 1,400 feet in the hole in one hour and 30 minutes.

Reno County

Another large producer was completed in the Lerado field, Reno County, at Shell Petroleum Corp. No. 5 Whipple, NW NE NE section 15-26-9w. Top of Viola lime was 4,137 feet; total depth, 4,140 feet. After acidizing, it flowed 638 bbls. of oil in five hours, with 2 per cent water, and later made potential of 5,034 bbls.

Ledo Oil Co. No. 3 Neufeldt, SE NW NW section 12-23-4w, Burrton field, topped Chat at 3,285 feet; total depth, 3,386 feet; and made potential of 497 bbls. of oil. Shell Petroleum Corp. No. 4 Welch A, NW NW SW section 9-24-4w, made potential of 168 bbls. of oil, with 135 bbls. of water, after acidizing with 2,000 gallons. Top of Chat was 3,297 feet; total depth, 3,400 feet.

Helmerich & Payne No. 1 Benson, NE cor. section 5-25-6w, wildcat, topped Chat at 3,663 feet; Viola lime, 4,088 feet; Wilcox sand, 4,130 feet, Siliceous lime, 4,183 feet; and was dry and abandoned at 4,195 feet, total depth.

The following new work in Reno County was reported: Sinclair Prairie Oil Co. No. 4 Mary Collins, NE SW SW section 3-24-4w, moving in material; same company's No. 2 Kaufman, SE SE SW section 18-24-4w, cellar; Magnolia Petroleum Co. No. 4 Harris, NW SE NW section 9-26-4w, cellar; Ohio Oil Co. No. 4 Lawson, SW NE NW section 15-26-9w, location; Shell Petroleum Corp. No. 7 M. Whipple, NE cor. section 15-26-9w, rigging up rotary.

Clyde Pulse and others No. 1 Payne, SW NW NE section 4-22-7w, wildcat in northern Reno County and south of the Hauschild area in Rice County, topped Chat at 3,426 feet; had a hole full of water at 3,440 feet, total depth; plugged back to 3,244 feet, and oil rose 500 feet in the hole. Texas Co. No. 9 Collins, C S half N half SE section 17-24-4w, flowed 180 bbls. of oil in 24 hours after acid treatment; total depth, 3,777 feet. Barnsdall Oil Co. No. 2 Westfall, NE NE SE section 19-24-4w, was bottomed at 3,387 feet and oil rose 2,300 feet in the hole in six hours. Indian Territory Illuminating Oil Co. No. 1 Mueller, NW NW NE section 30-24-4w, flowed 805 bbls. of oil in 24 hours at 3,380 feet, total depth. Ohio Oil Co. No. 3 Lawson, NW NE NW section 15-26-9w, topped Viola lime at 4,152 feet; total depth, 4,159 feet; and oil rose 2,000 feet in the hole in nine hours.

Harvey County

Shaffer and others No. 2-A Haury, C SE SE

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section 11-23-2w, Warkentine pool, Harvey County, topped Chat at 2,943 feet; was bottomed at 2,969 feet; flowed 297 bbls. of oil in six hours, and made potential of 1,126 bbls. Same operators' No. 1 Merwin, NE NE SE section 14-23-2w, topped Chat at 2,959 feet and was dry and abandoned at 2,979 feet, total depth.

Hipple and others No. 1 Morris, NW NW SW section 30-23-3w, Harvey County sector of the Burrton field, topped Chat at 3,270 feet; was bottomed at 3,371 feet, and made potential of 560 bbls. of oil.

New work in Harvey County: E. J. Shaffer and others No. 1 Steele, C W half NW SE section 12-23-2w, was a location; Olson Drilling Co. and Shell Petroleum Corp. No. 1 Schrag, NW NE SW section 30-23-3w, was a cellar.

Shell Petroleum Corp. No. 1 Blazer-Siemens, C W half W half NE section 8-22-3w, was bottomed at 3,558 feet and pumped 15 bbls. of oil and 25 bbls. of water in 48 hours. Dickey Oil Co. No. 1 Master, NE NE SW section 14-23-2w, plugged back from 2,961 feet, total depth, to 2,959 feet, and pumped 20 bbls. of oil and 20 bbls. of water in seven hours.

Ellis County

British American Oil Producing Co. No. 4 Bemis, SW cor. section 22-11-17w, Bemis pool, Ellis County, had Siliceous lime at 3,468-76 feet, total depth, and made potential of 2,949 bbls. of oil.

Only new work reported in Ellis County was at Bridgeport Machine Co. and others No. 1 Froelick, NW NW SE section 4-13-16w, which was being rigged up. It is a wildcat west of the south end of the Fairport pool.

Wolk Creek No. 1 Dreiling, NW NW SW section 4-12-17w, topped Siliceous lime at 3,526 feet; total depth, 3,531 feet; and swabbed 100 bbls. of oil in two hours.

Ellsworth County

Carter Oil Co. and others No. 3 Anna, SE NE SE section 27-17-9w, Lorraine field, Ellsworth County, pumped 278 bbls. of oil in nine hours at 3,159 feet, total depth; acidized and made potential of 1,538 bbls. of oil in 21 hours. Top of Siliceous lime was 3,147 feet.

Gulf Oil Corp. No. 3 Grizzell, SW NW NW section 31-17-10w, in the Ellsworth County sector of the Bloomer area, was moving in material.

Rush County

Schermerhorn Oil Co. No. 2 Schroeder, C NE section 36-18-16w, Albert-Otis area, Rush County, had La Motte sand at 3,651-57 feet, total depth; swabbed 356 bbls. of oil in 24 hours, with 3 bbls. of water, and on completion test was given potential of 267 bbls. of oil.

Woodson County

Pure Oil Co. No. 8 Peek, NE SE SE section 20-23-14, Winterscheid area, Woodson County, topped lime at 1,660 feet; total depth, 1,702 feet; acidized and pumped 80 bbls. of oil and 3 bbls. of water in 24 hours. C. L. Sheedy No. 2 Fuhlhage, C S half NW SE section 27-25-14, wildcat, had lime at 1,549-68 feet, total depth, and was dry and abandoned. Marshall and others No. 1 Weidie, SE SE SW section 17-25-14, was dry and abandoned at 1,550 feet, total depth.

Three new tests were reported in Greenwood County. Lauck & Moncrief No. 1 Gruber, NW cor. section 5-23-13, wildcat, set 10-inch casing at 975 feet and was waiting. It is between the Lamont and North Virgil areas in the northeastern part of the county. Lykes and others No. 1-A Beauchat, SW SW NE section 5-24-12, in the Hamilton area, was shut down at 220 feet; Lucille Oil Co. No. 1 Wiershing, C NW SE section 23-26-9, Reese sector, was rigging up machine.

Sedgwick County

M. Reynolds No. 1 Rogers, SE NE NE section 20-25-1e, Goodrich area, Sedgwick County, had a hole full of water at 3,366-70 feet, total depth, and was dry and abandoned.

Stafford County

Stanolind Oil & Gas Co. and Amerada Petroleum Corp. No. 1 Elwell, SW SW NE section 23-24-13w, an old well in the St. John area, Stafford County, was deepened from 3,621 feet; topped Viola lime at 3,880 feet; Siliceous lime, 4,065 feet; total depth, 4,102 feet; acidized, made potential of 2,252 bbls. of oil in 22 hours and was recompleted.

W. P. Faulkner No. 1 Schultz, SE SE NE section 6-22-13w, wildcat in Stafford County, was a cellar. It is southwest of the Gates area in northwestern part of the county. Atlantic Refining Co. and Phillips Petroleum Co. No. 1 McNaughton, NW NE NE section 27-24-13w, St. John area, was building rotary rig.

Decatur County

Winkler & Koch No. 1 Vessey, C NW SE section 26-3s-26w, wildcat in Decatur County, topped Topeka lime at 3,415 feet; Kansas City lime, 3,460 feet; Siliceous lime, 4,080 feet; Quartzite, 4,128 feet and was dry and abandoned at 4,149½ feet, total depth.

Butler County

Rex & Morris No. 1 Gilmore, SE SE NE section 13-25-6, wildcat in Butler County, was an abandoned location.

Roy Ramsey No. 1-A Weibe, SE SW NW section 6-24-6, Butler County, topped Viola lime at 2,625 feet; water intruded at 2,625-30 feet, total depth, and it was dry and abandoned.

Miscellaneous Fields

Twin Drilling Co. No. 1 Doughty, SW cor. section 15-8s-19w, an old wildcat in Rooks County, was rigging up to deepen. Old total depth was 3,225 feet. It is near the Walters area.

A new wildcat test was reported in Elk County. It was L. H. Wentz and others No. 1 Love, SW SE NE section 35-30-9, northwest of the Elco pool and of the town of Moline.

The only new work reported in Chautauqua County was at the wildcat test of Ira Scott and others. It was No. 1 Lambe, SW NW NE section 18-33-13, northeast of Sedan. Machine was being rigged up.

One new test was reported in the Wellington pool, Sumner County. It was Stelbar Oil Corp. No. 2 Barlow A, C W half E half SE section 33-31-1w. Ten-inch casing was set at 334 feet, and the crew was waiting on cement.

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Southwest Texas District

TWO NEW PRODUCING AREAS; OIL INDICATIONS NUMEROUS

By GEORGE WEBER

CORPUS CHRISTI, Tex., Mar. 22.—The opening of two new producing areas in Nueces and Bee counties; the discovery of new sand production in Seven Sisters and Saxet; numerous showings of oil in scattered wildcats and areal sand extensions in Saxet, contributed to an important week of developments in Southwest Texas.

Chapman Ranch Discovery

Success marked the second production attempt of Seaboard and Allen No. 2 Chapman during the week, as operators brought in the wildcat making an average 120 bbls. per day of pipe line oil on a one-eighth inch choke. After recementing perforations at 6,464-83½ feet with a squeeze job, casing, set at 6,570 feet, was again perforated at 6,460-67 feet, and the well was swabbed in, making oil without the salt water previously encountered. The producing sand was cored at 6,464-84 feet. Pressures recorded were 650 bbls. on the tubing and 750 pounds on the casing. The new field, tentatively named the Chapman Ranch field, lies about 1¾ miles southwest of the newly opened London field, marking a separate structure. Operators immediately staked two locations, and have moved onto one, No. 1-B Chapman which is two locations north of the discovery well. The pool is approximately 12 miles southwest of Corpus Christi.

In the London area, E. M. Jones No. 1 Cook is drilling below 4,300 feet. The test had sand at 3,532-39 feet which showed slight gas odor.

San Patricio County

Two San Patricio County tests had encouraging shows during the week. The Eleanor Oil Co., drilling No. 1 Green Estate, located about 4,000 feet southwest of No. 1 Kline wildcat which several months ago attracted considerable attention, cored sands with oil odor at the following depths: 6,573-77 foot, 6,580-90 feet, and 6,592-96 feet. At latest reports the operators were preparing to make drill stem tests. In the same general area, about 4 miles west of Gregory, the Phillips Petroleum Co. recovered 100 feet of mud with an oil odor before the testing tool slipped on No. 1 Schmidt. The test was made at 5,330-53 feet, and another test is to be attempted. The wildcat is located about 2½ miles southeast of the town of Taft.

Additions and Extensions

Fields of Nueces and Jim Wells counties saw important additions and extensions during the week. The most active area, Saxet, gained a new producing sand, and indicated extensions were seen in the more recently opened deep sands. South of Clarkwood townsite, Cox and Cryder No. 1, of the Port Oil & Gas Co., was brought into production in a new shallow sand at 3,181-86 feet. Formerly productive of only gas the sand yielded a 250-bbl. well, flowing on a one-quarter inch choke. Pressures were 250 pounds on the tubing and 500 pounds on the casing.

Besides completions in the 4,100,- 4,400,- 4,800- and 5,800-foot sands of the field, a number of interesting tests were on the deeper 6,300,- 6,700,- and 6,900-foot sands. In the western part of the field, the North Star Oil Co. completed No. 7 Rand Morgan on a workover. The test, formerly producing from the 5,800-foot Frio sand, was deepened to 6,764 feet and completed for 132 bbls. per hour on a one-eighth inch choke at 6,754½ feet. In Survey 582, the Pan American Production Co. brought in No. 4 Solar Sevier in the 6,300-foot sand.

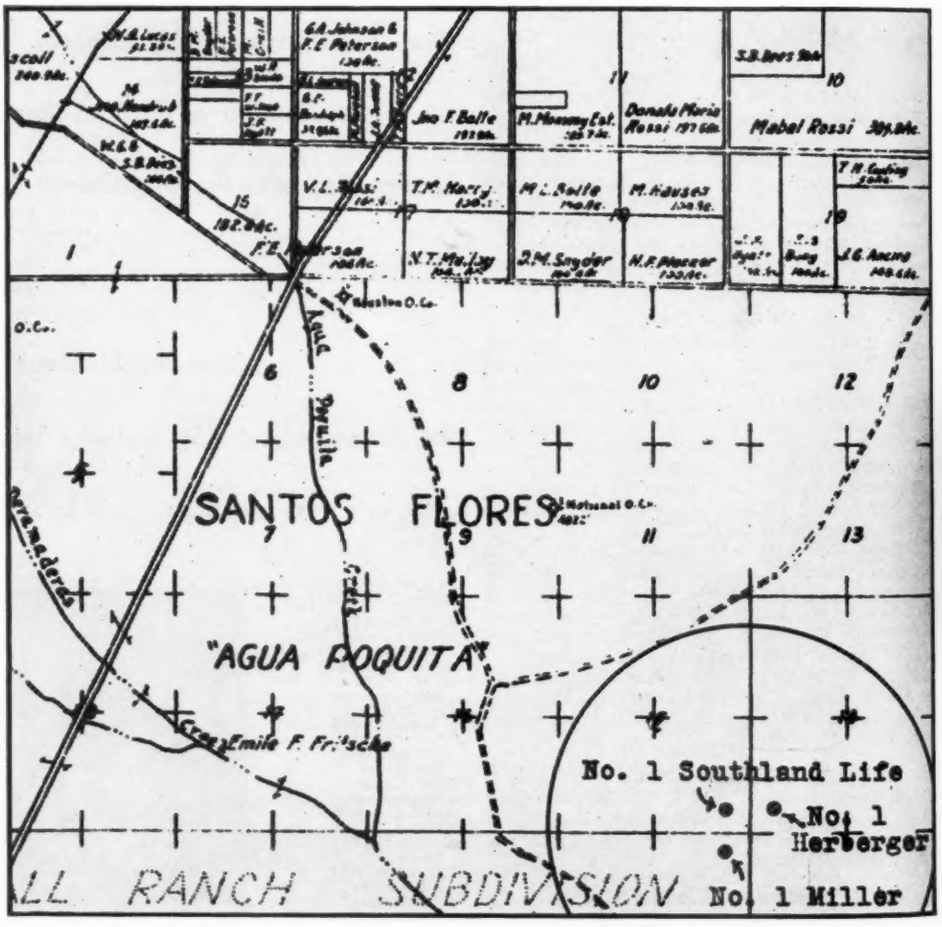
Outstanding among other tests which are at depths below 6,000 feet is Phillips Petroleum Co. No. 5 Hutchins, located in Block 29 of the Sheppard Farm Lots section. The test was cleaning into pits at latest reports to open a 10,800-foot northeast extension to the deepest producing sand at 6,893-99 feet. Distillate and oil sand was cored at 6,879-6,901 feet, underlain by 24 feet of dry sand, and another oil sand was reported indicated by a Schlumberger test at 6,925-37 feet. Completion of this test will have an important influence on the field, as it will doubtless continue the current drilling boom in the deep sands. Increasing activity is turning to these deeper horizons, as the previously opened 4,400-foot Clarkwood sands and the 5,800-foot Frio sands are drilled up.

Bee County came to the front in development news for the first time in several weeks, as the Dirks Brothers Co. No. 1 Strouch, a wildcat test, came in producing 180 bbls. per day of 45 gravity crude through a three-sixteenths inch choke. The producing sand is at 4,340 feet. The No. 1 Strouch is in section 19 of the Uranga grant, 2 miles northwest of Normanna, and a slightly less distance southwest of Tuleta. Production is coming from a sand about 300 feet deeper than that producing in the West Tuleta field, more than a mile north of the discovery.

Two Discoveries in Duval

Duval County headed the Laredo district in new developments during the past week, with discoveries in two fields. The Argo Oil Co. and J. Clopton No. 2 Smith Corkill, after showing considerable oil and salt water several days ago, was completed for about 30 bbls. of oil and 70 bbls. of salt water per day at 2,760-88 feet. The test is located on a 2,800-acre block about 2½ miles south of the Hoffman field.

The Humble Oil & Refining Co. opened what is generally believed to be the Mirando sand, with two producers during the week. No. 5 Dowdy fee, located in Survey 272, made 11 bbls. per hour on a one-eighth inch choke in sand at 2,558-65 feet. The No. 6 also was completed, making 22 bbls. per hour at 2,557 feet. The discovery, in the northwest edge of the field, marks the opening of the fifth producing horizon in the field. Wells are now flowing from two sands termed the Government Wells sands, a 2,200-foot Chernosky sand, a 2,700-foot Loma Novia sand on the east, and the newly opened Mirando sand.



Two additional producers are in the making in the newly discovered Sweden field of southern Duval County. The Hiawatha Oil Co. is on the 5,870-foot sand, with No. 1 Herberger and No. 1 Miller, offsetting the discovery, No. 1 Southland Life. This field, the deepest to be discovered in the Laredo area, is considered by some to be the forerunner of a number of deep discoveries in ancient shoreline sand deposits.—(Porter Regenold, Maps, Corpus Christi)

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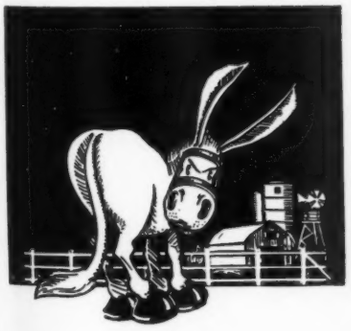

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Among Gulf Coast Drilling Contractors

An increase in drilling activity throughout the Gulf Coast district, during the past several weeks, has supplied contractors with all the drilling they can handle and several new rotaries have been purchased by various contractors to take care of this increase. In most cases the activity has been confined to the development of proven fields, where important extensions have opened more acreage for development. Fields effected by this new work and in which the majority of the work is being done by Gulf Coast contractors, include Amelia in Jefferson County, Hastings in Brazoria County, Dickinson in Galveston County and the Placedo field in Victoria County.

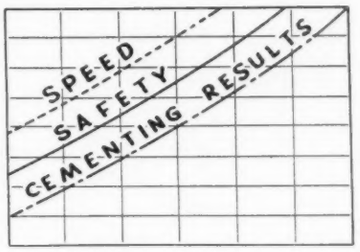
During the past week another increase in the number of new locations was made, as 44 locations were reported, all were in proven fields. Stanolind Oil & Gas Co., Humble Oil & Refining Co. and Coastwide Oil Co. accounted for 11 tests to be drilled in the Hastings field, while the balance were divided among Anahuac, Amelia, Silsbee, Big Hill, Hull, Segno, Raccoon Bend, Manvel, Old Ocean, Heyser, Big Creek, Boling, Dickinson, Tomball, Markham, Placedo, Five Corners, Pickett Ridge and Withers. Companies reporting new work include the Texas Co., Superior Oil Co., Magnolia Petroleum Co., Barnsdall Oil Co., G. F. Hamill, W. E. McKinney and others, John Deering, Gulf Oil Corp., Harrison & Abercrombie, Olsen Oil Co., J. K. Dorrance, and Republic Production Co.

Glenn H. McCarthy, who opened production for himself in the West Beaumont, Anahuac, and Cotton Lake fields, is believed to have uncovered a major field north of the town of Palacios in Matagorda County.

The first large diesel-driven rotaries ever used on the Gulf Coast are being moved in by R. B. (Cap) Best and Patrick and Tyrell, contractors of Oklahoma City. R. B. Best is setting up two 275-horsepower diesel engines in the Dickinson field in Galveston County for the Bennett Refining Co., while Patrick and Tyrell are moving their diesel-electric rig to the Pine Island Prospect in Jefferson Davis Parish for Louisiana Crusader Oil Co. No. 1 Langley, located about 5 miles northeast of Fenton. Seven oil companies that have protection acreage around the well have donated bottom-hole money. They include Pure Oil Co., Shell Petroleum Corp., Gulf Refining Co., Barnsdall Oil Co., Sun Oil Co., and the Felmont Oil Corp. Some small diesel rigs have been used in Southwest Texas and Humble Oil & Refining Co. has operated a smaller type of diesel-electric rig at Lake Washington.

Loffland Bros. opened a new field at the Abbeville Prospect in Vermilion Parish by the completion of a distillate producer for Continental Oil Co. and Gulf Oil Corp. which is located on the O. C. Hebert lease, just southwest of the town of Abbeville. This was the most interesting deep test ever drilled on the Gulf Coast and reached 12,216 feet before it was plugged back, due to mechanical trouble that developed after strong gas pressures were encountered. Present production is coming from perforation made in the 5-inch casing at 7,666-75 feet. The 5-inch casing was cemented at 11,795 feet, the longest ever run.

Supervising the drilling and producing methods in the newly discovered Sweden field, Duval County, are (left to right) James Coquat of the Longhorn Drilling Co. of Three Rivers, Tex., who drilled in the discovery well, and F. J. Hebert, production superintendent for the Hiawatha Oil & Gas Co.



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Oklahoma Operations

By
DAL DALRYMPLE

MAJOR WILCOX SAND STRIKE REVIVES LANGSTON DISTRICT

The first major oil strike in 1937 in Oklahoma was recorded the past week when Eason Oil Co. and others No. 1 Smith, SW NW NW section 13-17-1w, found gusher production in Wilcox sand pay and extended the Langston pool, Logan County, one-half mile eastward. At least, oil men generally are inclined to view it as the outstanding strike of the year to date in view of its showing on initial tests.

The well, in Wilcox sand at 5,112 to 5,128 feet, total depth, flowed 1,720 bbls. of oil in 5½ hours. In the fifth hour of the test it flowed 355 bbls. of oil, with about 800 feet of drill pipe still in the hole. Earlier in the week, it cleaned itself when plugs were drilled and made several big flows Thursday and Friday, prior to the more lengthy test. Gas volume was estimated from 5,000,000 to 8,000,000 feet. It is estimated production will average from 300 to 350 bbls. of oil an hour when completed.

Location is on a community tract between the discovery area and Langston townsite, in eastern Logan County. The Eason company owns one-half of the tract, with the remainder owned equally by Sinclair Prairie Oil Co. and Transwestern Oil Co. The three old producing wells in the Langston pool now are thought to be on the edge of a big pool. The pool was opened in 1934, the largest well having initial production of 630 bbls. of oil in 24 hours.

Two new tests already have been started in the Langston area. Ohio Oil Co. No. 1 Knight, C N half SW section 12-17-1w, one-half mile north of the new producer, was a location. Eason Oil Co. and O. A. Walter No. 1 Church, SW cor. section 24-17-1w, 1½ miles south of the No. 1 Smith, is the other operation. Much other new work in the general area is expected to follow the strike.

Elsewhere in Oklahoma, work was getting under way at new deep wildcat tests. O. O. Owens, George W. Kinney and associates staked location and were moving in rotary derrick at No. 1 Frier, NE SE NE section 34-1s-3e, 4½ miles south of Sulphur, in Murray County.

Continental Oil Co. and associates have started work at No. 1 Anderson, SW SE NE section 33-8-20, in Haskell County. It is 2 miles east of Kinta and 9 miles east of the Quinton gas area. It will seek Ordovician pay, expected around 7,000 feet.

Pontotoc County

Only four new oil wells were completed in the Fitts field, Pontotoc County, a small number for that busy sector. Offsetting completions were first reports of 13 new operations.

Fleetborn Oil Corp. No. 6-A Morin, NW SE SE section 20-2n-7e, was the largest of the new wells. It flowed 544 bbls. of oil gross through casing in 45 minutes after acidizing with 10,000 gallons, and made potential of 4,211 bbls. Top of Hunton lime was 3,620 feet; Sylvan shale, 3,910 feet; total depth, 3,919 feet.

Skelly Oil Co. No. 8 Metropolitan Life, NW SE SW section 23-2-7, topped Hunton lime at 3,547 feet; Sylvan shale, 3,926 feet; total depth, 3,932 feet; plugged back to 3,666 feet; acidized with 10,000 gallons; flowed 306 bbls. of oil net in two hours through tubing and made potential of 3,870 bbls.

Stahl Petroleum Co. No. 8-B Dennis, NW SW SW section 21-2n-7, made potential of 3,294 bbls. of oil after treating with 8,000 gallons of acid. Top of Hunton lime was 3,581 feet; total depth, 3,675 feet.

E. H. Moore and others No. 3-A Patrick, SW NW NE section 31-2-7, was completed at total depth of 4,440 feet as a producer from Wilcox sand topped at 4,408 feet. It made potential of 3,530 bbls. of oil, naturally. Same operators' No. 8 Smith, SE NE NW section 31-2-7, an old well, was deepened from 4,403 feet to Wilcox sand at 4,485 feet; new total depth, 4,490 feet. It flowed 289 bbls. of oil and made potential of 1,458 bbls.

C. Andree and others No. 1 Pettyjohn, NW NE SE SE section 2-1n-7, had a hole full of water in sand at 555-595 feet, and was temporarily abandoned at 898 feet, total depth.

J. B. Hagger No. 1 Bautsch, SW SW SE section 19-2n-4, spudded but was temporarily abandoned. Southard & Miller No. 1 Wilson, NW SE SW section 26-4-5, had a hole full of water at 40 to 50 feet and was temporarily abandoned.

Vaughn and Senora Oil & Gas Co. No. 1 Burke, NW SW NW section 33-5-5, in the Bebee area, topped Hunton lime at 2,166 feet; Sylvan shale, 2,281 feet; Viola lime, 2,418 feet; total depth, 2,501 feet. It was shot and pumped 90 bbls. of oil in 24 hours.

Many New Tests

New work in Pontotoc County: E. H. Moore No. 13 Akers, NE NW NE section 36-2-6, cellar and pits; Fleetborn Oil Corp. No. 1 Lewis, SE SE SW section 19-2-7, building rig; Sinclair Prairie Oil Co. No. 22 Woolley B, SW NE SW section 22-2-7, building rig; same company's No. 1 McCarty, SE NW NE section 22-2-7, location; J. Paul Getty No. 3 Masters, NW NW SE section 23-2-7, building rig; same operator's No. 4 Masters, SW SE NW section 23-2-7, location; Stahl Petroleum Corp. No. 1-B Dennis, SW NE NW section 28-2-7, cellar and pits; Skelly Oil Co. No. 19 Park College, NW SW NE section 28-2-7, building rig; same company's No. 20 Park College, SW NW NE section 28-2-7, building rig; same company's No. 21 Park College, SE NE NW section 28-2-7, cellar and pits; Magnolia Petroleum Co. No. 18 Simpson, SE SE NE section 29-2-7, cellar and pits; E. H. Moore No. 3-B Woodruff, NE NW SE section 29-2-7, cellar and pits; same operator's No. 4-A Woodruff, NW NW SE section 29-2-7, location; W. A. Delaney and others No. 1-A Starrett, NE NW SE section 21-5-5, location; H. Woodson and others No. 1 Ivey, NE SW SW section 21-5-5, cellar and pits.

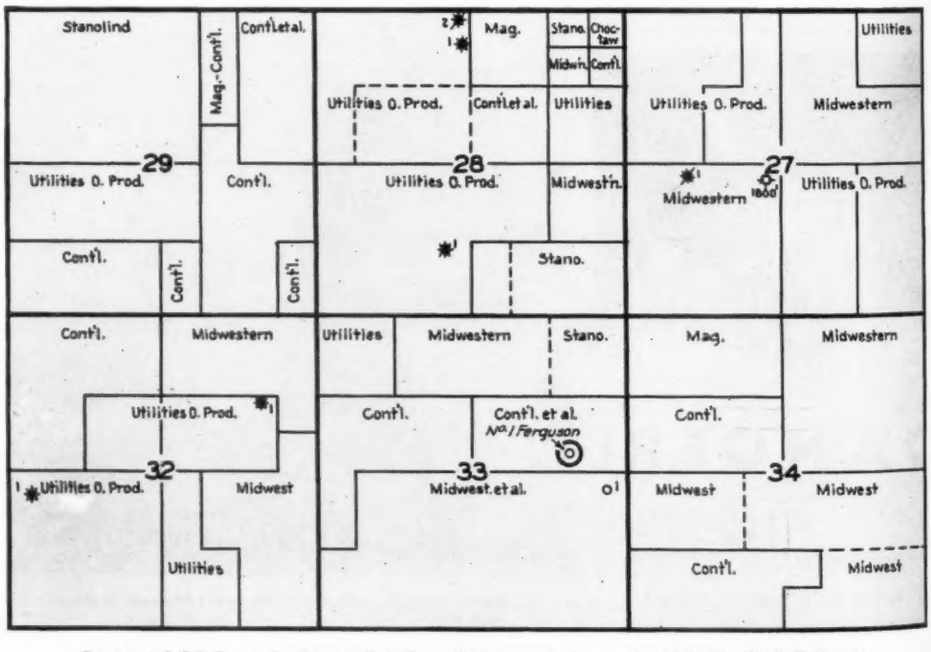
E. H. Moore No. 2 McCarty, NE SW NE section 22-2-7, topped Hunton lime at 3,800 feet; total depth, 3,830 feet; and flowed 515 bbls. of oil through Hydril in two hours, with 6,000,000 feet of gas. Skelly Oil Co. No. 9 Metropolitan Life, NE SE SW section 23-2-7, was bottomed at 3,945 feet and flowed 528 bbls. of oil in two hours through casing; it was acidized with 10,000 gallons and flowed 317 bbls. of oil net in two hours through tubing. Carter Oil Co. No. 12 Smith, NE NE SW section 28-2-7, flowed 78 bbls. of oil in 12 hours after a shot; it was acidized and flowed 300 bbls. of oil in five hours; total depth, 3,470 feet. E. H. Moore and others No. 6-A Harper, SE NW NE section 29-2-7, topped Hunton lime at 3,458 feet; Sylvan shale, 3,750 feet; total depth, 3,765 feet; acidized with 5,000 gallons and flowed 237 bbls. of oil in three hours on gas lift.

Seminole County

The only new Seminole County well was in the North Bethel pool. It was Amerada Petroleum Corp. and others No. 2 Noble, NW SE SW section 25-10-7e. Cromwell sand was found at 3,613 feet, and it was bottomed at 3,628 feet. It made potential of 1,092 bbls. of oil. It is at the northeast corner of production in the pool and is offset on the north by a dry hole.

E. W. Jones No. 1-A Berry, SW NW NW section 2-8-5, an old well in the Carr City area, was deepened from 4,165 feet to 4,182 feet, topping Wilcox sand at 4,170 feet. It was shot, pumped 64 bbls. of oil and 250 bbls. of water in 24 hours and was recompleted.

Winona-Jarvis-Holmes No. 2 Wolfe, SE SW SE



Continental Oil Co. and others will drill an Ordovician test in section 33-8n-20e, Haskell County.
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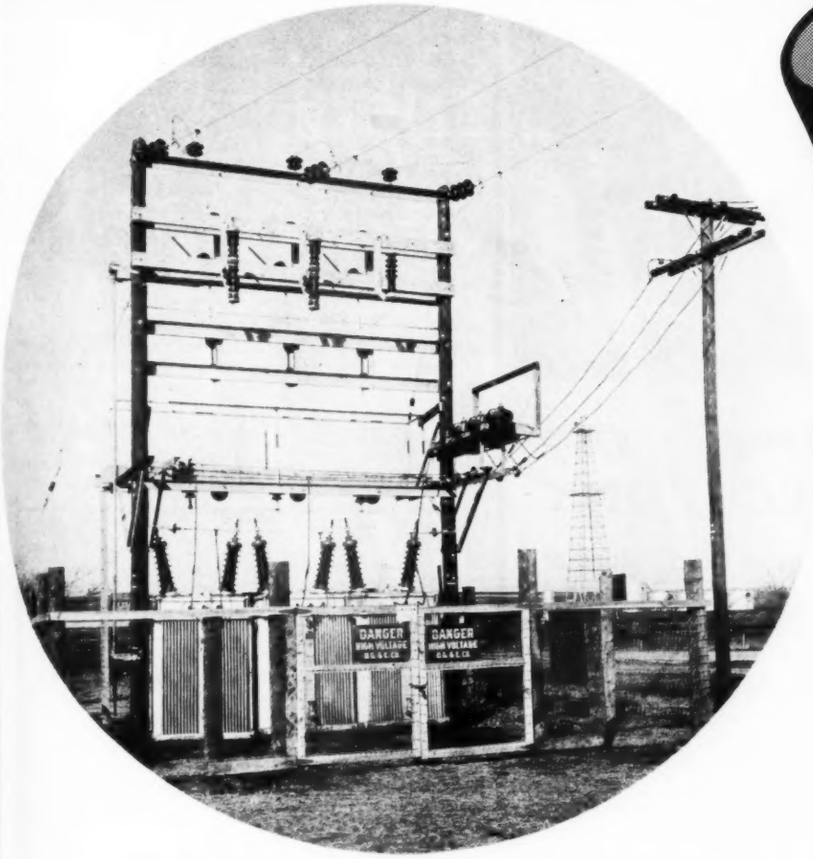

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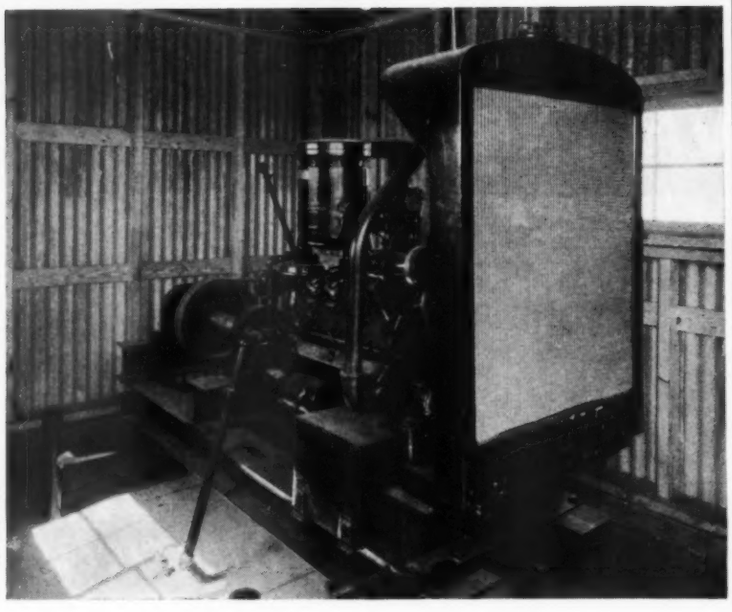

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section 18-7-8, an old well in the Fish sector, was deepened to 3,304 feet, plugged back to 3,013 feet and recompleted as a Gilcrease sand producer. After shooting and ripping casing and shooting again, it was recompleted as a 30-bbl. pumper.

The following new work was reported in the North Bethel area: Amerada Petroleum Corp. and associates No. 1 R. Noble, SE SW SE section 25-10-7, cellar and pits; same company's No. 1 Billington, NE NE SE section 35-10-7, rig corners; same operator's No. 1 Yarnah, NW SW NE section 36-10-7, cellar and pits; same operator's No. 3 Pryor, SE NE NW section 36-10-7.

Other new work in Seminole County: Carter Oil Co. No. 1 Tewee, SW NW NE section 14-7-6, an old well, cleaning out; Fleetborn Oil Corp. No. 1 Lucy Ard, NE NW SE section 28-8-8, location; Wood Oil Co. No. 1 Mayhue, NE cor. section 14-9-6, spudded; Deep Rock Oil Corp. No. 3 Lozier, an old well being deepened, drilling at 3,625 feet.

J. E. Crosbie and others No. 1 McGirt (Miller), SW SE SE section 25-10-7, one-half mile east of production in the North Bethel pool, was bottomed at 3,664 feet and flowed 519 bbls. of oil in 24 hours. It later flowed 380 bbls. of fluid in 24 hours, cutting 36 per cent salt water and basic sediment; and then flowed 282 bbls. of fluid in 24 hours, cutting 35 per cent water and basic sediment. Top of Cromwell sand was 3,647 feet.

Gulf Oil Corp. No. 1 McIntosh, SE cor. section 26-10-7, one location west of production in the North Bethel area, topped Cromwell sand at 3,609 feet; was bottomed at 3,627 feet; swabbed 40 bbls. of oil and 70 bbls. of water in 17 hours through casing, and was to be put on the pump.

Estimated Daily Production

Estimated daily average production of Oklahoma for the week ending March 20, and for the preceding week, was as follows:

	Barrels	
	Mar. 20	Mar. 13
Allen	6,500	6,450
Burbank	7,600	7,500
South Burbank	16,100	16,750
Balance Osage	21,500	21,750
Blackwell district	4,925	4,950
Bristow-Slick	8,000	8,000
Chandler	3,550	3,675
Crescent	18,175	12,950
Cromwell	3,275	3,275
Cushing-Shamrock	10,250	10,500
Duncan district	3,800	3,825
Edmond	36,125	23,475
Fish	6,825	7,000
Fitts	92,075	89,675
Graham	4,750	4,725
Gray	1,400	1,350
Healdton	9,600	9,650
Hewitt	4,350	4,325
Holdenville	900	900
Keokuk	8,100	7,000
Lucien	13,750	13,500
Marshall-Lovell	800	850
Oklahoma City	155,250	141,750
Olympic	15,425	15,575
Papoose	950	925
Polo	1,725	1,750
Sasakwa and townsite	2,925	3,025
Sholem-Alechem	3,275	3,250
Seminole:		
Bowlegs	11,900	9,925
Carr City	5,700	5,775
Earlsboro	6,050	6,075
South Earlsboro	700	725
East Earlsboro	7,800	7,875
Little River	11,150	11,500
East Little River	1,200	1,175
Maud	825	850
Mission	2,200	2,250
Seminole	9,875	9,925
East Seminole	3,625	3,675
Searight	4,850	4,825
Total Seminole	65,875	64,575
St. Louis-Pearson	22,125	22,350
Tatums	4,275	4,250
Tonkawa-Garber-Thomas	10,500	6,750
Wewoka	3,650	3,675
Yale-Jennings	4,125	4,150
Other pools	85,000	80,250
Total Oklahoma	657,450	615,925

Okfuskee County

Two new oil wells were completed in the Olympic field, Okfuskee County. Ark Royalty Co. No. 1 Brooks, NE NE SW section 18-10-9, topped Senora sand at 1,868 feet; total depth, 1,892 feet; swabbed 150 bbls. of oil in 24 hours; was shot, and pumped 175 bbls. of oil and 8 bbls. of water in 24 hours. Same operator's No. 6 Fisher, SE NW SE section 18-10-9, swabbed 75 bbls. of oil in 24 hours after a shot and then pumped 150 bbls. in 24 hours. It topped Senora sand at 1,858 feet and was bottomed at 1,915 feet.

Hayes Drilling Co. No. 1 Richardson, SW cor. section 12-10-8, an old wildcat north of the Olympic area and east of the Cromwell field, was deepened from 1,217 feet to 2,019 feet, new total depth,

and was dry and abandoned. It topped Calvin sand at 1,757 feet; Henryetta coal zone, 1,995 feet.

The following first reports of new work in Okfuskee County were filed: Manahan Oil Co. No. 4 Bunner, NE NE SE section 24-10-8, location; Chapman & McFarlin No. 4 Williams, SE NE SW section 25-10-8, cellar and pits; Ark Royalty Co. No. 9 Fisher, SW NE SE section 18-10-9, building rig; Sinclair Prairie Oil Co. No. 4 Schultz, NW NE NW section 18-10-9, location; W. B. Wells No. 7 Micco, C W half SE NE section 14-10-11, location; Carter Oil Co. No. 3 Welty, C NE NE section 2-11-8, location; Mid-Continent Petroleum Corp. No. 1 Gofford, NE NE NW section 35-12-7, wildcat, building rig.

Oklahoma County

Magnolia Petroleum Co. No. 1 School Land, NE cor. section 36-14-4w, on the west edge of the Edmond field, Oklahoma County, flowed 450 bbls. of oil through tubing in 24 hours after acidizing, and later made potential of 952 bbls., cutting about 5 per cent water. It topped Simpson Dense at 6,468 feet; Dolomite, 6,505 feet; second Wilcox sand, 6,706 feet, and plugged back to 6,585 feet to complete.

Travis Petroleum Co. No. 5 Lucas, SW SW NW section 36-12-3w, was an abandoned location in the Oklahoma City field.

Phillips Petroleum Co. No. 2 Gast, SW SW NW section 26-12-3w, an old Oklahoma City well, was plugged back from 6,620 feet to 4,000 feet; redrilled to 5,292 feet, new total depth, drill pipe stuck, and it was abandoned.

Two new Oklahoma County tests were reported. British American Oil Producing Co. No. 1 Johnson, NW NW SE section 27-12-3w, was rigging up rotary. Ohio Oil Co. No. 14 Dahl, SW NE SE section 31-14-3w, was a location.

Cleveland County

Gulf Oil Corp. No. 2 James, SE NW SW section 27-10-2w, Moore pool, Cleveland County, topped second Wilcox sand at 7,277 feet and was completed at 7,281 feet, total depth. It flowed 2,666 bbls. of oil in three hours, with 9 per cent salt water and basic sediment. On potential test it flowed 4,561 bbls. of oil in four hours, cutting 26 per cent, and made potential of 19,281 bbls. Gas averaged 40,869,000 feet.

Pottawatomie County

A new oil well was completed in the Shawnee pool, Pottawatomie County, at Stanolind Oil & Gas Co. No. 2 U. R. Rushing, SE SW SE section 32-11-4e. It topped Earlsboro sand at 4,397 feet; was bottomed at 4,431 feet, and flowed 586 bbls. of oil through casing in 24 hours.

B. H. Rowlett and others No. 1 Burson, SW SW NE section 21-9-4, wildcat, was an abandoned location.

Tom Phillips and others No. 1 Breidenthal, C W half NE NE section 23-11-6, North Keokuk area, an old well, was plugged back from 4,532 feet to

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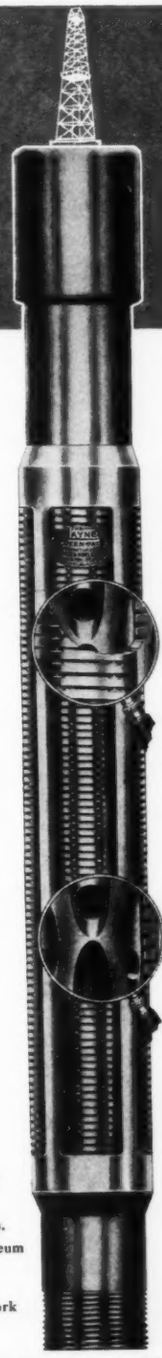

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The LAYNE WIRE WRAPPED SCREEN is made with any size or kind of pipe from 1″ to 16″ in diameter. It is perforated in vertical staggered rows without causing any appreciable weakening of the pipe.

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THE LAYNE WIRE WRAPPED SCREEN

4,356 feet, shot and flowed 57 bbls. of oil in 24 hours, recompleted.

Tom Phillips and others No. 2 Breidenthal, C E half NW NE section 23-11-6, the only new test reported in Pottawatomie County, was a location.

Osage County

Ray Branstetter and Bay Oil Corp. No. 4 Osage, SW SE SW section 28-22-11, Osage County, topped Arbuckle lime at 2,042 feet; total depth, 2,056 feet; flowed 95 bbls. of oil a day and was completed.

Peters Petroleum Corp. and Midstate Oil Co. No. 11 Osage, SW NE NW section 32-24-9, topped Oswego lime at 1,763 feet; was bottomed at 1,801 feet. It was acidized with 2,000 gallons and pumped 30 bbls. of oil daily.

Bay Oil Corp. and others No. 2 Good, SW NE SE section 25-24-7, topped Arbuckle lime at 2,790 feet and was dry and abandoned at 2,880 feet, with a hole full of water.

Midco Oil Corp. No. 1-A Osage, SW cor. section 17-22-10, an old well, was deepened from 2,000 feet to 2,037 feet, acidized, pumped 50 bbls. of oil daily and was recompleted.

New work in Osage County: J. D. Simon and others No. 18 Osage, NW SW NW section 7-21-9, location; Gray & Tolson No. 1 Osage, SE SW NW section 27-21-9, location; Midco Oil Corp. No. 6 Osage, NW SE SW section 17-22-10, rigging up machine; Pure Oil Co. No. 172 Osage, NE NW SE section 5-23-8, rigging up machine; C. I. Sills and others No. 14 Osage, SE cor. section 32-23-11, an old well, to be deepened; Lewis Production Co. No. 14 Osage, SE NE NE section 28-24-7, location; same operator's No. 3 Osage, NW NE NE section 33-24-7, location; Morrison & Alexander No. 7 Osage, CWL E half SE section 35-25-11, location.

Logan County

Another big producer was completed in the Crescent field, Logan County, at Carter Oil Co. and others No. 4 Walker, NE NW NE section 33-17-4w. Top of second Wilcox sand was 6,146 feet; total depth, 6,300 feet. After shooting, it flowed 1,715 bbls. of oil in four hours and made potential of 9,229 bbls., with gas averaging 34,400,000 feet.

Hughes County

Mid-Continent Petroleum Corp. No. 1 R. Winters, C NW SE section 4-8-10, Hughes County, was completed as a gasser at 3,113 feet, total depth. Gas gauged 3,000,000 feet.

Kay County

Ritz Oil & Gas Co. and others No. 1 State, NW NE SW section 16-29-2w, wildcat in northwestern Kay County, near the Sumner County, Kansas, line, was dry and abandoned at 4,449 feet, total depth. It topped Stalnaker sand at 2,934 feet; Layton, 3,325 feet; Chat, 4,035 feet; Mississippi, 4,040 feet; Woodford, 4,375 feet; Wilcox sand, 4,425 feet; and had salty sand and slight odors of oil in cores to total depth.

Prunty Production Co. No. 1-A Diller, SE NW SE section 12-26-2w, Kay County, was building rig. Clarke Nye and others No. 2-A McCullough, SW NW SE section 5-28-1w, was a rig.

Pawnee County

Christie & Reynolds No. 5 Finley, SW NE NW section 31-21-9e, Pawnee County, had Layton sand at 1,101-25 feet, and was dry and abandoned at 1,134 feet, total depth.

Payne County

Mulberry Oil Co. No. 2 O'Herren, SW NW NE section 5-17-5e, was location for a new test in Payne County.

Creek County

Jackson & Wise No. 1 fee, NE NE SE section 14-19-9, Creek County, had Layton sand at 1,267-1,302 feet; total depth, 1,327 feet; was shot, pumped 16 bbls. of oil daily and was completed. Turner and others No. 3 Berryhill, C E half NE SE section 1-16-11, Mounds area, was completed as a 4-bbl. pumper at 1,827 feet, total depth. Big Four Petroleum Co. No. 1-C Evans, NW NW SE section 31-19-9, had a hole full of water and was dry and abandoned at 2,557 feet, total depth. Texas Co. No. 1-A Jefferson, C NW NW section 28-18-12, had a showing of oil and gas in Bartlesville sand at 1,515-53 feet; total depth, 1,604 feet; plugged back to 1,553 feet and was completed as a repressure well.

New work in Creek County: Sinclair Prairie Oil Co. No. 6 Lowe, NW cor. section 10-17-7, an old well, moving in material to deepen; Berry Brothers and others No. 2-A Ingalls, C S half SE SE section 24-17-7, spudded; Shaw, Doak & Hughes No. 1 White, SW SE SW section 24-17-7, building rig; J. H. Wright No. 5 Davis, NE SE NW SE section 27-17-10, drilling at 700 feet; C. O. Buckles No. 3 fee, C NW NE section 22-18-8, rigging up machine; J. E. Crosbie, Inc. No. 5 Lacey, C NE NW section 22-18-8, rigging up standard tools; Tibbens No. 2 Washington, SE NE NE section 27-15-8, rig.

Muskogee County

Joe Paul and others No. 1 Monday, SE cor. section 4-13-16, Muskogee County, had sand at 1,740-53 feet; total depth, 1,754 feet; produced 3,000,000 feet of gas and was completed. Jimmie Lyons and others No. 1-A Bender, C SE SE section 13-15-17 was dry and abandoned at 1,399 feet, total depth. Riverland Oil Co. No. 2 Dean, C S half S half SE section 28-14-17, an old well, was deepened from 2,110 feet to 3,134 feet, total depth, and was dry and abandoned.

M. S. Mussellem No. 2 Shultz, SE NE SE section 33-14-19, the only new Muskogee County test reported, was moving in machine.

Okmulgee County

Lynch and others No. 6 C. Thomas, C N half NE NW section 30-14-14, Okmulgee County, an old well, was deepened from 1,350 feet to 1,965 feet, total depth, and was dry and abandoned.

Atoka County

Phelps & Coats and others No. 1 Fidelity Life, SE SW NW section 23-1s-12e, wildcat in Atoka County, was abandoned at 750 feet, total depth.

D. Malarnee and others No. 2-A DOK Ranch, SE cor. section 35-2s-13, an old Atoka County well,

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On these river lockgates, anti-corrosive primer fortified with Bakelite resin remains intact after more than 17 months' service.

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HOURS IMMERSED WITHOUT DETERIORATION

	Boiling water	*5% Caustic Soda*
Linseed Oil	¼	⅛
Non-phenolic Synthetic vehicle	¼	¼
Old-fashioned Spar Varnish	1	2
Bakelite Resin Spar Varnish	7	24

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BAKELITE

SYNTHETIC RESINS

was deepened from 3,136 feet to 4,605 feet, and was temporarily abandoned.

Garvin County

Wright-Smith Oil Co. No. 3 Yates, SE NW SW section 33-1n-3w, new test in the Tussy area, Garvin County, set casing at 277 feet and was waiting on cement at total depth of 280 feet.

Coal County

Continental Oil Co. No. 1 Cleland, NW SW NE section 26-1n-8, Coal County, was dry and abandoned at 1,575 ft. Small stains of oil were reported in sand from 1,090 feet to 1,250 feet. Same operator's No. 1 Hodson, SE NE NW section 26-1n-8, was an abandoned location, as was same operator's No. 1 O'Neal, NE SE NW section 26-1n-8.

Carter County

Skelly Oil Co. No. 2 Miller T, NW NW NE section 5-1s-3w, Carter County sector of the Tussy area, had sand series beginning at 1,771 feet; was bottomed at 2,832 feet and plugged back to 2,500 feet. After perforating casing and acidizing, flowed 171 bbls. of oil in 24 hours and was completed as a pumper.

Roy M. Johnson No. 18 Davis, SE SE NW section 6-4s-3w, Healdton field, had sand at 1,173-80 feet, total depth, and was completed as a 4-bbl. pumper. Magnolia Petroleum Co. No. 7 Hayner-Mills, SE NW NE section 27-2s-3w, an old well, was deepened from 2,250 feet to 2,834 feet, produced 1,600,000 feet of gas and was recompleted.

Two new operations in Carter County were reported. Karl Carter No. 2-A Harley, SW NW NW section 19-2s-3w, had spudded. Cox & Hamon No. 7 Jackson, NW SE NE SW section 15-4s-2w, an old well, was rigging up to deepen.

Lincoln County

Amerada Petroleum Corp. and others No. 1 Stewart, NE SE NW section 15-13-6, Lincoln County, was building rig. Same operators' No. 1 I. B. Angell, NE NE SW section 35-14-6, was building rig.

Tillman County

Indian Territory Illuminating Oil Co. and others No. 1 Hatler, C SW NE section 32-2s-17w, wildcat south of Frederick in Tillman County, finally was completed as a 78-bbl. pumper after plugging back from 5,169 feet, total depth, to 4,525 feet. It had sandy lime at 4,414 to 4,435 feet. Top of Viola lime was 4,549 feet; Simpson lime, 4,682 feet. At 3,964-68 feet, it flowed at the rate of 50 bbls. of oil an hour on short test, and was hailed as a new pool opener then, but water soon intruded and predominated, necessitating deepening.

Comanche County

L. D. Wise No. 1 E. A. Cones, SE SE SW section 11-1n-10w, wildcat in Comanche County, had sand showing oil and gas at 1,003-12 feet, but was dry and abandoned at 2,156 feet, total depth.

English Drilling Co. No. 2 Clark, NE NE SE section 28-2n-10w, only new test reported in Comanche County, was a rig.

Kiowa County

Burnes and others No. 1 Enzy, NE SE NE section 33-7-20w, Kiowa County, was an abandoned location, but may be drilled later.

Kiowa Oil Corp. No. 1 Finder, C SW NE section 4-6-20w, new Kiowa County wildcat, had machine on location for a shallow test.

Grady County

R. E. Johnson and others No. 1 Thomas, SE SW SE section 18-5-7w, Grady County wildcat, was an abandoned location.

T. H. McCasland No. 3 Ray Horton, NE SW NW section 8-3n-5w, Knox area, Grady County, was a machine.

Love County

W. H. Riddle and others No. 1 Johnson, C SW SE section 20-8s-2w, Love County wildcat, was dry and abandoned at 4,009 feet, total depth, in shale. No showings of oil were reported.

Jefferson County

Palmer and others No. 2 Barrett, SE SW SW section 19-6s-5w, Spring area, Jefferson County, was a location.

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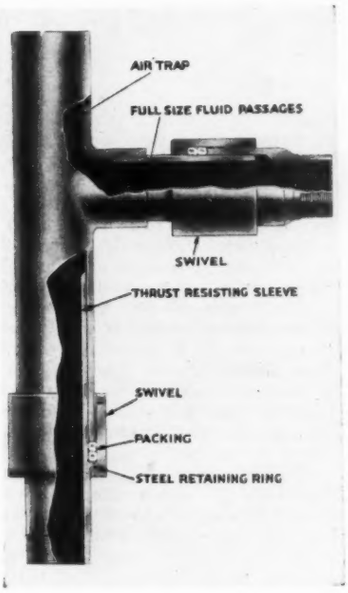

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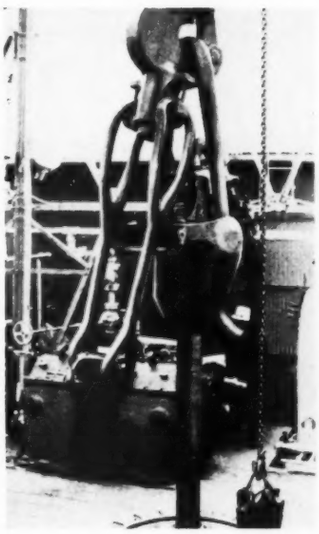

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Rocky Mountain Area

By
T. R. INGRAM

ANOTHER TERTIARY TEST IN MOFFAT COUNTY, COLORADO

DENVER, Colo., Mar. 22.—Contracts were signed in Denver this week providing for another Tertiary test in northwestern Colorado on the South Vermilion Creek structure in Moffat County. The Garcia Corp.'s No. 1 McClung, Las Animas County, was abandoned. The South Park Oil Co. No. 1 Lemar had another oil show estimated at 35 bbls. at 4,160 feet.

The district between Douglas and the Lance Creek field in Wyoming is the scene of an intensive leasing play, and one deep test in the area is resuming. The Ohio Oil Co. has spudded in on the old Rex Lake dome in Albany County. The Amerada Petroleum Corp.'s wildcat in Laramie County was abandoned at 9,385 feet. Progress is reported in plans for unitizing Salt Creek. The Ohio Oil Co. No. 7 Putnam, in Lance Creek, made 792 bbls. initial through the tubing. Two new locations were released. Osage had three completions of which two were dry holes.

The Ohio Oil Co. recompleted its No. 1 Northern Pacific on the Dry Creek dome in Montana for 1,500,000 feet of gas after plugging back to the Frontier. Two locations were made in the Cut Bank field and drilling operations are resuming in the Kevin-Sunburst field.

NEW MEXICO

Eighteen wells were completed in Lea County and one in Eddy County.

Amerada Petroleum Corp. No. 2 Anderson, C SE SW section 8-20-27, Monument area, topped pay at 3,790 feet, was bottomed at 3,860 feet and had natural initial production of 513 bbls. of oil in 4½ hours, through choke on tubing. Same operators' No. 2 Phillips, C NE SW section 33-19-37, topped pay at 3,876 feet; total depth, 3,910 feet. It was acidized three times and swabbed 130 bbls. of oil in 12 hours; reacidized, and shot, and flowed 36 bbls. of oil in four hours through tubing.

Continental Oil Co. No. B-18-2 Britt, section 18-20-37, flowed 99 bbls. of oil naturally in 13 hours through choke. It topped pay at 3,794 feet; total depth, 3,880 feet.

General Crude Oil Co. No. 1-G State, section 16-20-37, topped pay at 3,840 feet; total depth, 3,850 feet, and flowed 120 bbls. of oil naturally through tubing in one hour.

Gulf Oil Corp. No. 3 Anderson, section 8-20-37, flowed 509 bbls. of oil naturally through tubing in six hours from pay at 3,870 feet; total depth, 3,815 feet. The No. 4 Anderson, C NW NE section 17-20-37, topped pay at 3,810 feet; total depth, 3,870 feet, and flowed 326 bbls. of oil naturally through tubing in six hours. Gulf No. 1-C Orcutt, C SW SE section 36-20-36, had initial production of 347 bbls. of oil, naturally, through tubing in six hours. Top of pay was 3,780 feet; total depth, 3,846 feet. Same company's No. 3 Sunshine, C NE SW section 30-20-37, had pay at 3,770 feet; total depth, 3,837 feet; acidized three times and flowed 84 bbls. of oil in 24 hours through tubing.

Humble Oil & Refining Co. No. 4 Laughlin, C SW SE section 4-20-37, flowed 39 bbls. of oil in two hours after acidizing. Pay was topped at 3,842 feet; total depth, 3,878 feet.

Repollo Oil Co. No. 6 Barber, section 7-20-37, flowed 245 bbls. of oil naturally, through choke on tubing, in 10 hours, at a total depth of 3,875 feet. Same company's No. 2 State, section 32-20-37, topped pay at 3,756 feet; total depth, 3,861 feet; acidized and reacidized, and had initial production of 78 bbls. in 12 hours, through choke.

Shell Petroleum Corp. No. 3-K State, C SW NE section 36-20-36, topped pay at 3,730 feet and was bottomed at 3,850 feet. It flowed 573 bbls. of oil naturally in three hours, through tubing.

Continental Oil Co. No. 18-B-4 Meyers, C NW NE section 4-21-36, Eunice area, topped pay at 3,773 feet and was bottomed at 3,840 feet. It flowed 13½ bbls. of oil in 12 hours; was shot and acidized, and flowed 86 bbls. through choke in 24 hours.

Humble Oil & Refining Co. No. 11 State Aggies, C NE NE section 31-20-37, flowed 24 bbls. of oil in two hours after acid treatment. Top of pay was 3,770 feet; total depth, 3,840 feet.

In the Sims area, Skelly Oil Co. No. 2 Ella Sims, C SW NE section 3-23-37, flowed 160 bbls. of oil naturally through tubing in eight hours, from pay topped at 3,520 feet. Total depth was 3,610 feet.

Culberson, Irwin & Stovall No. 2 Stuart, NW SE NE section 10-25-37, had main pay at 3,318-48 feet; was bottomed at 3,421 feet; and flowed 330 bbls. of oil naturally through tubing in 24 hours. Harry Leonard and others No. 1 Leonard-Lanehart, section 21-25-37, was bottomed at 3,446 feet; plugged back to 3,060 feet; perforated casing, and flowed 27 bbls. of oil in 24 hours, with 1,500,000 feet of gas. Repollo Oil Co. No. 2 Jamison, section 22-24-37, topped pay at 3,425 feet; total depth, 3,485 feet; shot and flowed 243 bbls. of oil through tubing in 24 hours.

In Eddy County, Flynn, Welch & Yates No. 75 State, C E half SE SE section 10-19-28, was abandoned but not plugged at 2,135 feet, total depth, in lime. Production was estimated at one-half barrel of oil daily.

Monument Area

Skelly Oil Co. No. 2 State F, C SW SE sec. 17-20-37. T.D. 3,691 ft.; drlg. plug.
Oil Well Drlg. Co. No. 2 Wood-State, NW sec. 16-20-37. Drlg. 3,445 ft.
Tide Water Oil Co. No. 2-I State, C NE SW sec. 16-20-37. T.D. 3,860 ft.; P.B.
Anderson-Prichard Oil Co. No. 7 Britt, SE NW SE sec. 7-20-37. T.D. 3,865 ft.; to deepen.
Amerada Pet. Corp. No. 3 Byrd, sec. 3-12-20. T.D. 3,875 ft.; testing.
Magnolia Pet. Co. No. 2 Cary, sec. 21-22-37. Drlg. 3,615 ft.
Texas Co. No. 1 Cook, SW NE NE sec. 32-19-37. Drlg. 3,872 ft.
Continental Oil Co. No. 3 Britt B, sec. 18-20-37. T.D. 3,872 ft.; flowed 50 bbls. in 5 hrs.
Phillips Pet. Co. No. 1 Mexico, NE cor. sec. 18-20-37. Drlg. 3,480 ft.
Continental Oil Co. No. 11 Sanderson A, C SE SE sec. 11-20-36. Drlg. 3,540 ft.
Gulf Oil Corp. No. 2 Hatchett, C SW NW sec. 33-19-37. T.D. 3,400 ft.; S.D.
Gulf Oil Corp. No. 3 Whitmore, C SE NW sec. 8-20-37. T.D. 3,095 ft.; cleaning out.
Skelly Oil Co. No. 2 Van Etten, C SW SW sec. 9-20-37. T.D. 3,810 ft.; set csg.
Skelly Oil Co. No. 3 Van Etten, C SE SW sec. 9-20-37. T.D. 3,790 ft.; running csg.
Gulf Oil Corp. No. 3 Graham-State F, C NW NE sec. 36-19-36. Drlg. 3,915 ft.
Amerada Pet. Corp. No. 6 Andrews, C SW SW sec. 12-20-36. Drlg. 3,282 ft.
Barnsdall Oil Corp. No. 7 Cooper, C NW SW sec. 7-20-37. T.D. 3,885 ft.; flowed 1,076 bbls. an hour; testing.
Ohio Oil Co. No. 3 State-McGrail, C NE SW sec. 26-19-36. Drlg. 3,555 ft.
Gulf Oil Corp. No. 4-F Graham-State, C SW SE sec. 36-19-36. Drlg. 2,990 ft.
Amerada Pet. Corp. No. 5 Byrd, C SE NW sec. 12-20-36. Drlg. 2,370 ft.
Amerada Pet. Corp. No. 1 Laughlin, W¼ NW NW sec. 9-20-37. T.D. 3,229 ft.; fishing.
Gulf Oil Corp. No. 5 Anderson, C SE NW sec. 17-20-37. T.D. 290 ft.; setting csg.
Phillips Pet. Co. No. 2 Mexico, C SW NE sec. 18-20-37. Drlg. 2,760 ft.
Superior Oil Corp. No. 1 State B, C NE SE sec. 13-20-36. T.D. 3,875 ft.; acidized.
Amerada Pet. Corp. No. 4 Lambert, C SE NE sec. 6-20-37. Drlg. 2,673 ft.
Ohio Oil Co. No. 2 Laughlin, C SE NW sec. 9-20-37. Drlg. 3,120 ft.
Amerada Pet. Corp. No. 4 Phillips, C NW NE sec. 1-20-36. Drlg. 702 ft.
Amerada Pet. Corp. No. 1-X State, C NW SW sec. 16-20-37. Derrick.
Amerada Pet. Corp. No. 8 Weir, C NW NW sec. 35-19-36. Drlg. 2,110 ft.
Barnsdall Oil Co. No. 8 Cooper, C SE SE sec. 12-20-36. Drlg. 130 ft.
Continental Oil Co. No. 16-C-1 State, C SW NW sec. 16-20-37. Drlg. 1,085 ft.
Gulf Oil Corp. No. 1 Bates, C SE SE sec. 26-19-36. Drlg. 3,117 ft.
Gulf Oil Corp. No. 1-D Orcutt, C NW NE sec. 13-20-36. Drlg. 800 ft.
Phillips Pet. Co. No. 1 Edna-State, C NW NW sec. 30-20-37. T.D. 166 ft.; set csg.
Phillips Pet. Co. No. 1 Mexico-State, C NE NE sec. 30-20-37. T.D. 1,120 ft.; set csg.
Repollo Oil Co. No. 4-A Phillips, NW SW sec. 31-19-37. Drlg. 750 ft.
Tide Water Oil Co. No. 2 Laughlin, C NE SW sec. 4-20-37. Bldg. derrick.
Amerada Pet. Corp. No. 3-V State, NE sec. 36-19-36. Derrick.
Amerada Pet. Corp. No. 3-F State, SW sec. 36-19-36. Moving in rotary.
Stanolind O. & G. Co. No. 3 Gillully, SW sec. 33-20-37. Derrick.
Shell Pet. Corp. No. 3-M State, NE sec. 1-21-35. T.D. 172 ft.; set csg.
Amerada Pet. Corp. No. 2-A Byrd, sec. 12-20-36. Bldg. derrick.
Amerada Pet. Corp. No. 2 Laughlin, sec. 9-20-37. Bldg. derrick.
Gulf Oil Corp. No. 6 Anderson, sec. 17-20-37. Cellar and pits.
Gulf Oil Corp. No. 1 Bell-State, sec. 36-20-36. Derrick.
Gulf Oil Corp. No. 2-F Bell-State, sec. 36-20-36. Location.
Gulf Oil Corp. No. 3-F Bell-State, sec. 36-20-36. Location.
Humble O. & R. Co. No. 5 Laughlin, sec. 4-20-37. Loc.
Humble O. & R. Co. No. 3-F State, sec. 17-20-37. Cellar and pits.
Phillips Pet. Co. No. 1 Hudson-State, sec. 30-20-37. Loc.
Phillips Pet. Co. No. 1 Quapaw-State, sec. 10-20-37. Drlg.
Repollo Oil Co. No. 4 Byrd, sec. 11-20-36. Loc.
Texas Co. No. 2-K State, sec. 18-19-37. Drlg.

Chaves County

J. & L. Drlg. Co. No. 1 Hurd, C SE NW sec. 14-11-26. T.D. 190 ft.; R.U.R.
Elliott No. 1 State, NW sec. 16-8-23. T.D. 773 ft.; fishing.
English & Harmon No. 1 Billingslea, SE sec. 9-15-29. Cellar and pits.
Warman Oil Co. No. 1 Weldan & Hoar, sec. 9-14-25. T.D. 1,728 ft.; fishing.

Eunice Area

Getty Oil Corp. No. 1 State D, C SE NE sec. 32-20-37. T.D. 3,860 ft.; S.D. for orders.
Gulf Oil Corp. No. 4 Collins, C NE SW sec. 14-21-36. T.D. 3,880 ft.; swabbing.
Gulf Oil Corp. No. 4 Leonard, C SW NE sec. 22-21-36. T.D. 3,905 ft.; P.B. to 3,892 ft.; testing.
Jim Murray No. 4 State-Wallace, sec. 3-21-36. Cellar.
Gulf Oil Corp. No. 1 Bell-Ramsey B, C SW SW sec. 29-20-37. T.D. 3,715 ft.; set csg.
Gulf Oil Corp. No. 5 Leonard, C NE NE sec. 22-21-36. Drlg. 3,844 ft.
Amerada Pet. Corp. No. 3-W State, C SW NE sec. 30-20-37. W.O.C. at 3,732 ft.
Amerada Pet. Corp. No. 4-W State, C SE SE sec. 30-20-37. W.O.C. at 2,546 ft.
Continental Oil Co. No. 7-D-15 State, C NW SE sec. 15-21-36. T.D. 3,878 ft.; flowed 114 bbls. an hour.
Gulf Oil Corp. No. 12-C Arnott-Ramsey, C NW SE sec. 21-21-36. Derrick.
Shell Pet. Corp. No. 2-H State, CWL NE NE sec. 13-21-35. Drlg. 3,555 ft.
Atlantic Ref. Co. No. 5 State L, C NW NW sec. 3-21-36. Drlg. 3,510 ft.
Two States et al No. 1 State, C SE NW sec. 11-21-36. Drlg. 3,820 ft.
Gulf Oil Corp. No. 2 White, C NE SE sec. 25-20-36. T.D. 1,080 ft.; set csg.
Texas Co. No. 6 Lieu-Lands, C NW NE sec. 20-20-37. Drlg. 3,245 ft.
Mid-Continent Pet. Corp. No. 1 Reener, C NW NW sec. 29-20-27. T.D. 2,520 ft.; set csg.
Texas Co. No. 5 State-Aggies, SE NE SE sec. 31-20-37. Drlg. 2,750 ft.
Tide Water Associated Oil Co No. 1 Marshall, C SW NE sec. 13-21-36. Derrick.
Continental Oil Co. No. 14-B-6 Lockhart, C SW SW sec. 14-21-36. Drlg. 2,705 ft.
Continental Oil Co. No. 15-D-8 State, C SE SE sec. 15-21-36. Drlg. 2,224 ft.
Ohio Oil Co. No. 6 McDonald, C SE SW sec. 16-22-36. Cellar.
Oil Well Drlg. Co. No. 1 State A, C NW NW sec. 16-22-36. T.D. 2,762 ft.; S.D.
Stanolind O. & G. Co. No. 1 Owen, NW sec. 3-22-37. Derrick.
Devonian Oil Co. No. 2 State, SE sec. 3-21-36. Drlg. 2,855 ft.
Continental Oil Co. No. 30-A-4 Lockhart, sec. 30-21-36. Location.

Hobbs Area

Stanolind O. & R. Co. No. 9 State, sec. 9-19-38. Location.
Stanolind O. & R. Co. No. 7-X Thorpe, sec. 18-19-37. T.D. 280 ft.; set csg.

Sims Area

Skelly Oil Co. No. 1 R. R. Simms C, C SE SW sec. 3-23-37. T.D. 3,388 ft.; S.D. for orders.
Penrose & Rowan No. 3 Cary, C SE NW sec. 22-22-37. Drlg. 2,530 ft.
W. H. Street et al No. 1 Wood, C W½ SE NE NE sec. 22-22-37. T.D. 3,654 ft.; C.O. after shot.
J. E. Farrell No. 1 Walden, C sec. 15-22-37. T.D. 3,656 ft.; cleaning out.
J. E. Farrell No. 1-A Walden, C SW NW sec. 15-22-37. T.D. 3,551 ft.; S.D.

Skelly Oil Co. No. 4 Baker, C SW NW sec. 27-22-37. T.D. 3,390 ft.; set csg.
Texas Co. No. 1 Falby, C NE NW sec. 8-22-37. Set surface pipe; W.O.C.
Skelly Oil Co. No. 1 Sticher, sec. 4-22-37. Location.
Gulf Oil Corp. No. 1 Davis, sec. 8-23-37. Location.

Cooper Area

Southern Oil Corp. No. 1 Gates, C SW NW sec. 23-24-26. T.D. 3,514 ft.; S.D. for orders.
Continental Oil Co. No. 1 Danciger, C NW NE sec. 8-22-36. Drlg. 3,426 ft.
Amerada Pet. Corp. No. 3 Isabell, C SW NE sec. 15-24-36. Derrick.

Lea County—Miscellaneous

Plains Prod. Co. No. 4 Knight, C SW SW sec. 22-24-37. T.D. 3,535 ft.; testing.
Brown & Reynolds No. 1 Parcell, C NW SE sec. 8-21-38. Wildcat; T.D. 4,373 ft.; fishing for swab.
Amon G. Carter No. 2 Elliott, C NE NW sec. 22-22-37. T.D. 3,622 ft.; drlg. by bit.
Magnolia Pet. Co. No. 1 State G, NW NW NE sec. 24-17-34. T.D. 4,905 ft.; P.B. 4,775 ft.; shot and C.O.
Culberson-Irwin & Stovall No. 3 Stuart, NE SE SW sec. 10-25-37. Preparing to spud.
Continental Oil Co. No. 1 Wantz, C SW SW sec. 21-21-37. T.D. 3,815 ft.; to deepen.
Ohio Oil Co. No. 5 State-McDonald, sec. 16-22-36. Drlg. 5,146 ft.
Stanolind O. & G. Co. No. 1 Meyers, sec. 22-24-37. T.D. 3,553 ft.; to shoot.
Texas Co. No. 1 Alexander, sec. 5-21-37. T.D. 3,540 ft.; set csg.
Sun Oil Co. No. 2 Stewart, C SW NE sec. 15-25-37. Drlg. 1,253 ft.
Tide Water Associated Oil Co. No. 2 Walden, C SW NE sec. 21-22-37. T.D. 3,468 ft.; fishing.
Continental Oil Co. No. 1 Skaggs Permit, C NE SE sec. 24-20-37. Wildcat; T.D. 3,851 ft.; set 5½-in. csg. at 3,785 ft.
Shell Pet. Corp. No. 2 Black, C SW SE sec. 21-24-37. T.D. 3,220 ft.; drlg. plug.
Texas Co. No. 3 Sheppard B, SW NE NE sec. 5-26-37. T.D. 3,290 ft.; testing.
J. L. Perry No. 1 Elliott, SE cor. sec. 19-21-37. Derrick.
Samedan Oil Co. No. 3 Hughes, sec. 4-23-37. Drlg. 2,275 ft.
Texas Co. No. 2 Black, sec. 21-24-37. Drlg. 2,640 ft.
Gulf Oil Corp. No. 1 Hardy, C SE SW sec. 20-21-37. Drlg. 90 ft.
Mack & Stauffer No. 1 Grizzell, C NW NE sec. 8-22-37. Drlg. 3,075 ft.
Anderson-Prichard Oil Corp. No. 1 Wells, C SE SE sec. 5-25-37. Waiting on machine.
Herschback et al No. 1 Alston, C SW NE sec. 31-17-37. Wildcat; drlg. 760 ft.
J. C. Clower No. 2 Turner, SW SW SE sec. 29-21-37. Drlg. 2,970 ft.
Continental Oil Co. No. 4 McCallister A, C N½ NE SE sec. 24-26-36. Set 7-in. csg. at 3,083 ft.; W.O.C.
Williams & Cockburn No. 3 Miller, C SW SW sec. 23-17-32. T.D. 3,470 ft.; fishing.
Gulf Oil Corp. No. 1 Mattern B, NE NE SE sec. 30-21-37. Drlg. 1,330 ft.
Ohio Oil Co. No. 1 Grizzell, C SW SE sec. 5-22-37. T.D. 280 ft.; set csg.
Mid-Continent Pet. Corp. No. 1 Boren, C NE NE sec. 20-22-36. Drlg. 574 ft.
Stanolind O. & G. Co. No. 2 Myers, SW sec. 4-24-37. Moving in material.
Stanolind O. & G. Co. No. 3 Myers, SE sec. 4-24-37. Loc.
Gulf Oil Corp. No. 1 Boyd, sec. 23-22-37. Location.
Gulf Oil Corp. No. 2 King, sec. 28-21-37. Location.
Gulf Oil Corp. No. 1 Shahan, sec. 33-25-37. Wildcat; location.
Gulf Oil Corp. No. 1 Woolworth, sec. 30-24-37. Wildcat; location.
Repollo Oil Co. No. 2-B Stuart, sec. 10-25-37. Location.

Eddy County

Etz Bros. No. 3 State, sec. 16-17-30. T.D. 3,252 ft.; acidized; est. 10 bbls. oil per day.
McGinley & Harwell No. 7 Mann, SW cor. sec. 4-18-27. T.D. 2,285 ft.; S.D. for tubing.
Flynn, Welch & Yates No. 1 Gissler, SW SE SW sec. 14-17-30. T.D. 3,503 ft.; swabbing and testing.
Adams et al No. 1 Page, sec. 15-21-18. Wildcat; machine.
Republic Prod. Co. No. 7 Russell A, NW SE NW sec. 18-17-31. Drlg. 3,134 ft.
Republic Prod. Co. No. 3 Robinson Permit, C NE NE sec. 27-17-29. T.D. 2,305 ft.; drlg. plug.
Barnsdall Oil Co. No. 5 Dodd, sec. 22-17-29. T.D. 2,393 ft.; drlg. plug.
Flint Prod. Co. No. 1 Flint, sec. 14-17-30. T.D. 3,459 ft.; acidized; flowed 150 bbls. oil per day.
William Dooley No. 2 Hatchett, SW SW NE sec. 14-20-26. T.D. 80 ft.; S.D.
Nells Wills et al No. 1 Chase, C NW SW sec. 6-20-30. Wildcat; drlg. 1,430 ft.
H. C. Wells et al No. 1 State, NW SW NW sec. 19-20-30. Wildcat; drlg. 1,245 ft.
H. & W. Drlg. Co. No. 1 Forgarty, C SW SW sec. 14-23-29. Wildcat; drlg. 150 ft. in new hole.
Flint Prod. Co. No. 1-B Flint, sec. 20-17-30. Drlg. 570 ft.
Murchison No. 1-B State, SE sec. 16-17-30. Drlg. 635 ft.

Roosevelt County

Clovis Corp. No. 2 Wilmes, C SE NE sec. 17-2s-30e. Drlg. 2,640 ft.
Wirt Franklin and Flynn, Welch & Yates No. 1 Catts, C NW NW sec. 28-3n-30e. T.D. 5,195 ft.; to plug back and test.

Otero County

George Muldey No. 1 State, SW cor. sec. 11-25-8e. T.D. 263 ft.; S.D.
O. K. Hearte No. 1 Hattie Evans, NW NW SW sec. 22-24-12. O.W.D.D.; wildcat. T.D. 1,951 ft.; S.D.

COLORADO

Adams County

Glenridge Oil Co. No. 1 Hills, SE SE SE sec. 27-3s-64w. T.D. 4,345 ft.; 6¼-in. parted; 2,000 ft. rec.; remainder coming out.

Huerfano County

S. W. Pressey No. 1 Ojo, SW NE sec. 10-29s-69w. Drlg. 3,350 ft. after lowering 5 3/16-in. to bottom to S.O. cavings caused by gas; Dakota expected 3,900 ft.

Larimer County

L. D. Charboneau et al No. 1 Thompson, C NE sec. 12-4n-70w. Drlg. 120 ft. (first report, Berthoud field).

Las Animas County

The Garcia Corp. No. 1 McClung, NE NW SE section 19-33s-61w, Garcia district, was plugged and abandoned at 1,816 feet, with a hole full of water from the Lykens formation. The test is located to the northeast of the wells of the Mountain States Oil Corp. producing gas from the Timpas at around 1,100 feet. This is the first test in the district to go below the Dakotas. Three-fourths of a mile to the northeast, in section 20, a well drilled on the McClung ranch in 1927 had a strong show of gas with water in the Dakota and was abandoned at 813 feet.

Moffat County

A deal was concluded in Denver whereby the Anderson-Kerr Drilling Co., of Oklahoma, and others, will start operations for a test by April 1 on the South Vermilion Creek structure, 6 miles south of the Hiawatha field in which oil has begun to show in some of the gas wells. The same group have an option to drill this summer on the adjoining Shell Creek structure, 3 miles south and a little east of the Hiawatha field. The same interests are at present drilling a well on the Dry Creek structure. The South Vermilion Creek test will be drilled with rotary equipment and the objective horizons are expected about 600 to 700 feet deeper than at Hiawatha. Extensive coring will be done and a paleontologist will stay at the well. The group headed by Anderson-Kerr company have more than 20,000 acres in the district.

Mountain Fuel Supply Co. No. 1 Donnell, C SE NE sec. 31-12n-97w. Cmtd. 13⅜-in. at 298 ft.; W.O.C.
Anderson-Kerr Drlg. et al No. 1 Govt., C SE SE sec. 19-9n-99w. Rng. 12½-in. cave string to 1,350 ft.

Morgan County

Swisher et al No. 1 Lunt, SE cor. sec. 3-4n-60w. S.D.O. 1,718 ft.

Park County

The South Park Oil Co. No. 1 Lemar, in the Hartsel district, had another show of oil in shale at 4,160 feet. It was not tested, but was estimated at 35 bbls. per day. It had a show estimated at 25 bbls. a day at 4,070-74 feet. It had a show of 2 bbls. per day of 52 gravity green crude at 1,501 feet. At present total depth it is not yet in sand and the horizon is not identified. This well started 1,900 feet in the Pierre and the same company's

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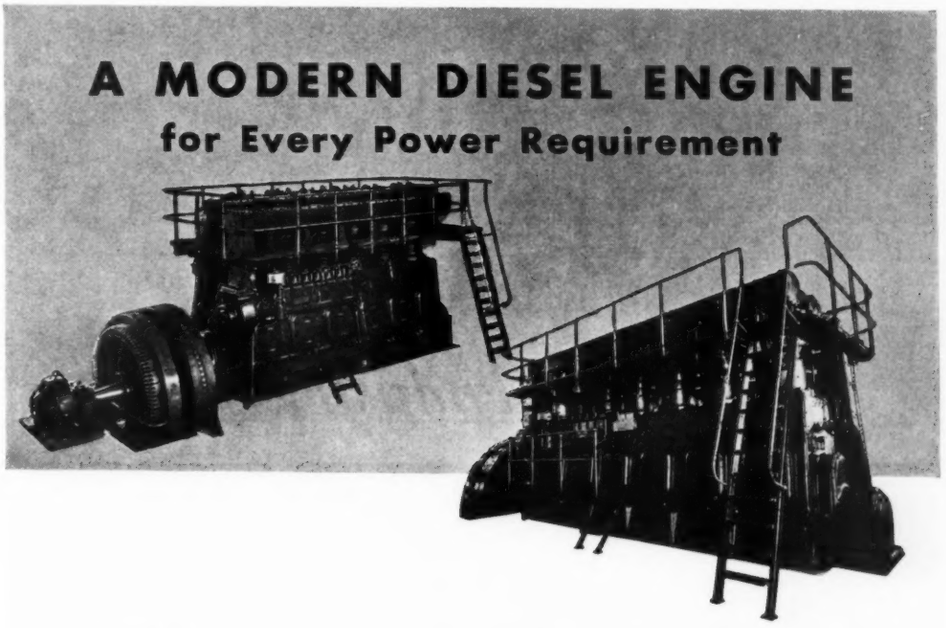

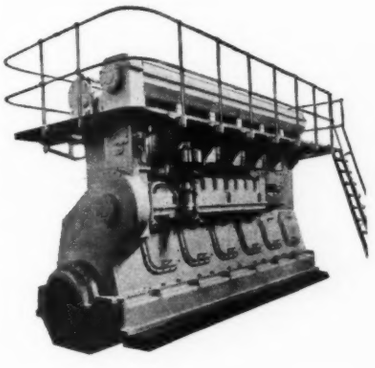

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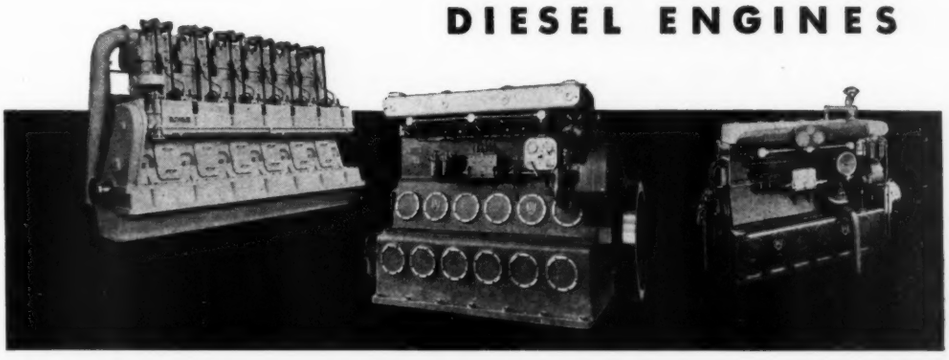

No. 1 State, 3 miles to the north, started 80 feet above the top of the Pierre.

South Park Oil Co. No. 1 Lemar, NE NE SE sec. 34-11s-75. T.D. 4,160 ft.; prep. to run 8¾-in.
South Park Oil Co. No. 1 State, SE NE SW sec. 16-11s-75w. S.D. 5,705 ft.

WYOMING

Albany County

The Ohio Oil Co. has spudded in on the Rex Lake structure due west from Laramie and approximately 10 miles southwest of the Quealy dome, in its No. 1 Louis E. Coughlin, SW NE NW section 26-16n-77w. Oil was discovered on this dome in 1923 in the Muddy sand at around 3,000 feet. The oil averaged 35 gravity, but was low in gasoline content. The marketing of production began in 1924 and up to the end of 1935 the output was 221,665 bbls. No production was reported in 1936. Two wells were producing in 1935.

Ohio Oil Co. No. 1 Coughlin, SW NE NW sec. 26-16n-77w. Drlg. 403 ft.
Murphy Oil Co. No. 1 Holst-Woolf, NW NW NW sec. 19-17n-76w. Rng. drk. corners.
Murphy Oil Co. No. 3 Wilson, SW NW SW sec. 18-17n-76w. Drlg. 1,409 ft.

Big Horn County

Stock Oil Co. No. 1-B Allen, Lot 52, sec. 32-56n-97w. T.D. 4,176 ft.; sat. core in Madison; cmtd. 7-in. 3,903 ft.
Ohio Oil Co. No. 1 Baker-Byron, SE NW sec. 23-56n-97w. Drlg. 3,253 ft.
Ohio Oil Co. No. 1 State, NE cor. Lot 38, sec. 36-56n-97. T.D. 5,418 ft.; W.O. acid; small well on swbg. test in Embar-Tensleep at 5,331-5,418 ft.

Carbon County

Ohio Oil Co.-California Co. No. 2 Kyle, C SE SE sec. 26-21n-79w. Drlg. 3,465 ft.
Ohio Oil Co.-California Co. No. 4 Union Pacific, C SW SW sec. 25-21n-79w. Drlg. 2,016 ft.
Ohio Oil Co. No. 1 H.&C., SE SE SW sec. 35-20n-78w. T.D. 3,293 ft. in sat. sd.; tstg.
Ohio Oil Co. No. 7 H.&C., C NW sec. 2-19-78. T.D. 5,671 ft.; P.B. to 5,630 ft.; tstg.

Converse County

Leases recently taken by the Carter Oil Co., the Adams-Louisiana Co., the Elbe Oil Land Development Co., and others in the district east of the town of Douglas and southwest of the Lance Creek field in Converse and Niobrara counties are being placed on record. The Carter company recorded leases on 3,200 acres in Niobrara County and 1,120 acres in Converse County, all patented land, principally in Townships 32 and 33n, Ranges 66, 67 68 and 69w. Last month the company put on record leases in sections 8, 9, 17 and 18-32n-68w; section 35-32n-69w, and sections 21, 22 and 27-32n-68w.

The Elbe Oil Land Development Co.'s block of 10,000 acres is mostly in the north half of Township 31n-70w, and south half of Township 32n-70w. This block surrounds the location of the old Criterion well in C SW NE section 5-31-70, which was lost at 3,650 feet in 1930. It had some shows of oil.

The Adams-Louisiana Co. has considerable acreage, mostly in sections 27, 28, 30, 32 and 33-31n-70w.

Chadron-Osage Oil Co. No. 1 State, SW cor. sec. 16-32n-69w. Resumed at 3,050 ft.; rng. tour.
Wyoming Southern Oil Co. No. 2 Salisbury, NE NW SE sec. 27-32n-69w. Drlg. 150 ft.

Laramie County

The Amerada Petroleum Corp. No. 1 Morton, C SW SW section 13-13n-68w, Borie High, southwest of Cheyenne, is being plugged and abandoned at a total depth of 9,385 feet in shale, after testing the Jelm sand in the top of the red beds and finding it dry. This well holds the record for depth for the Rocky Mountain area and is credited with having run the heaviest string of casing in this county. Last fall it ran 7,075 feet of 11¾-inch weighing more than 215 tons and cemented it with 2,500 sacks. It was reported drilling in the Hygiene at 4,150 feet; had the Coddell at 7,892-7,908 feet; top of the Niobrara at 7,595 feet; Timpas at 7,870 feet; Greenhorn lime at 8,070-85 feet; Muddy at 8,558-66 feet; top of Dakota at 8,693 feet; top of Sundance at 9,038 feet and top of Jelm at 9,205 feet. Elevation is 6,522 feet.

Natrona County

Representatives of oil companies operating in the Salt Creek field are reported in Chicago for a conference with officials of the Standard Oil Co. of Indiana regarding plans for the unitization of that field and repressuring the Second Wall Creek sand with gas. Engineers for some of the operating companies, headed by T. S. Harrison, of Denver, and assisted by representatives of the U. S. Geological Survey, have been making a detail study of the field and the feasibility of bringing in gas from the Big Horn Basin, or some other source, and operating the field as a single unit. As a preparatory step several of the holding companies, including the Midwest Oil Co., the Mountain & Gulf Oil Corp., the Salt Creek Consolidated Oil Co., the Wyoming Associated Oil Co., and others, have been consolidating their properties. Practically no information regarding the progress of the plans has been made public and to what extent they have progressed is known only by those directly concerned.

Empire State Oil Co. No. 3-U, SE NE sec. 33-34n-83w. Drlg. 2,265 ft.
Wyalta Oil Co. No. 4 Govt., NW NW sec. 5-29n-81w. Cmtd. 6⅝-in. on top of Sundance at 1,032 ft.; rng. 2-in. tbg. to test at 1,030-72 ft.
Wyalta Oil Co. No. 5 Govt., SW SW sec. 30-30n-81w. Drlg. 600 ft.
Wyalta Oil Co. No. 6 Govt., NW NW sec. 5-29n-81w. Bldg. road to loc.

Niobrara County

The Ohio Oil Co. No. 7 Carrie Putnam, SW NE SW section 33-36n-65w, an inside location in the Lance Creek field, was completed at 4,020 feet and tested 792 bbls. through the tubing the first 24 hours. It was still in saturated basal Sundance sand when drilling stopped. It had saturated sands at 3,930-65 and 3,975-4,020 feet. Top of first Sundance was at 3,771 feet. It cemented the 7-inch at 3,928 feet.

The Ohio Oil Co. has gone back into its No. 9 Elizabeth Lamb, C SE NE section 5-35n-65w, an outside well on the southeastern flank of the structure and has cored it 18 feet deeper from old total depth of 4,072 feet. At the new total depth it was still in saturated sand. It will be drilled deeper gradually until the sand is penetrated or water encountered. Several wells in that area have stopped while still in sand and this operation will determine whether the other wells can be safely deepened.

Ohio Oil Co. No. 8 Putnam, SW SE SW sec. 33-36n-65w. R.U.R. (first report).

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MacKinnie Oil & Drlg. Co. No. 2 Thompson, NW NW NE sec. 7-35n-65w. Cellar (first report).
J. M. Huber Corp. No. 1 Midwest, SE SE SW sec. 27-36n-65w. R.U.R.
Holly Dev. Co. No. 1 Novick, NE SE SW sec. 6-35n-65. T.D. 3,990 ft. in L.; basal Sundance 3,967-90 ft.; swbg. and tstg.; flowed 32 bbls. in 1 hr.
Ohio Oil Co. No. 5 Leo, NW NW SW sec. 35-36n-65w. Cg. 3,650 ft.
Continental Oil Co. No. 3-B Schuricht, C SE SE sec. 6-35n-65w. Cg. 3,951 ft. in basal Sundance; top sat. 3,931 ft.

Park County

General Pet. Corp. No. 1 Govt., NW NW NW sec. 33-47-100. T.D. 5,684 ft.; test unsatisfactory; will D.D.

Platte County

Dividend O. & R. Co., Inc., No. 1, CSL NW SW sec. 17-24n-66. S.D. 2,385 ft.; C.D.

Washakie County

The Yale Oil Corp. has completed an 18.5-mile 2-inch welded oil line from the Hidden Dome pool to its refinery at Worland and started running oil on March 9. It is pumping around 800 bbls. daily from producing wells and storage.

Arlton & Doyle No. 1 Govt., SW SW SE sec. 29-48n-91w. T.D. 1,356 ft.; prep. to resume.

Weston County

Three wells were reported completed in the past week, of which two were dry holes. The Wheedon Oil Co. No. 19, SW cor. section 16-46n-63w, was completed at 415 feet for 1 bbl. per day from sand topped at 440 feet. Charles Stough No. 5-X, C NW NW section 4-46-63, was dry at 300 feet, and his No. 6-X, C NW SW section 4-46-63, was dry at 305 feet.

Carl Kundy No. 3 Govt., CSL NW NW sec. 32-46n-63w. M.I.M. (first report).

MONTANA

Carbon County

The Ohio Oil Co. No. 1 Northern Pacific, SE NE SW section 11-7s-21e, an old well in the Dry Creek field originally completed in the Second Frontier for 9,000,000 feet of gas a day, which resumed drilling last June to test the Dakota, has been recompleted for 1,500,000 feet a day in the Frontier at 4,460-70 feet after plugging back from 5,572 feet. It had water in the Lakota at 5,542-72 feet. It is a west offset to the discovery well in the Frontier.

Miracle Oil Co. No. 2 Govt., CWL NE SE sec. 3-6s-23e. T.D. 1,260 ft.; landed 8¼-in. at 1,250 ft.; fsg.

Fallon County

Montana-Dakota Utilities Co. No. 3 Smith No. 1, Unit 8, C SE NW sec. 8-4n-62e. T.D. 6,811 ft.; will test before D.D.; not commercial at 6,750-65 ft.

Glacier County

The Texas Co. and the Santa Rita Oil & Gas Co. resumed drilling in the Cut Bank field this week with one location each after the winter shutdown.

Texas Co. No. 1 Stufft, C NW NW Lot 4, sec. 1-35n-6w. M.I. rotary (first report).
Santa Rita O. & G. Co. No. 1 Madison, CWL NW SW sec. 30-34n-5w. Loc. (first report).
Kately, Drumheller-Ward No. 5, C Lot 4 (SE SE) sec. 10-34n-6w. Drlg. 2,100 ft.
Wm. Hanlon, Agt. No. 2 All.-128, C NW SE sec. 12-32n-6w. Drlg. 260 ft.
Dakota-Montana Oil Co. No. 1 Tribal-136, C NE NE sec. 15-34n-6w. T.D. 1,995 ft.; P.B. to 600 ft.
Wm. Hanlon, Agt. No. 2 All.-131, C Lot 9 (SW NW) sec. 7-32n-5w. Drlg. 825 ft.; Colo. 405 ft.; 10¾-in. 362.
Glacier Prod. Co. No. 1 Abraham, C SW SE sec. 19-34n-5w. Drlg. 2,065 ft.
Glacier Prod. Co. No. 5 Seeba, CWL NW NW sec. 2-34n-6w. Drlg. 2,375 ft.
Glacier Prod. Co. No. 1 Williams, C SW SE sec. 21-33n-5w. Cmtd. 8¼-in. 2,843 ft.; S.O. 2,847-54 ft.
Dr. Peter Potter No. 2 All.-125, NW NE NE sec. 12-32n-6w. Drlg. 310 ft.
R. C. Tarrant No. 1 Kirst, C NW SW sec. 18-34n-5w. Drlg. 2,160 ft.

Petroleum County

O. B. Canfield No. 1 Govt., CEL SE NE sec. 21-17n-24e. Drlg. below 761 ft.
H. C. Rowland No. 1 Kalispel, NE NE SE sec. 35-14n-25e. Drlg. 750 ft.

Toole County

Drilling operations have been resumed to a limited extent in the Kevin-Sunburst field following cold weather and snow which buried some of the pump houses to their roofs. The first completion this year is expected within a few days in William M. Fulton No. 1 Thompson, NW SW NE section 28-35n-3w, which is drilling in at 1,765 feet after being shut down since the first of the year.

W. S. Knight No. 1 Gunderson, SW SE NW sec. 9-35n-2w. Drlg. 1,000 ft.
A. E. Crumley No. 11-A Shaw, SE NW NE sec. 35-36n-2w. Skdg. rig from No. 11; hole lost.
A. Beardslee No. 5 Swears, CSL SE NW sec. 9-35n-2w. Drlg. 250 ft. (first report).

Yellowstone County

R. C. Tarrant No. 1 Kelly, SE SE NW sec. 26-3s-24e. Spdg. (first report).

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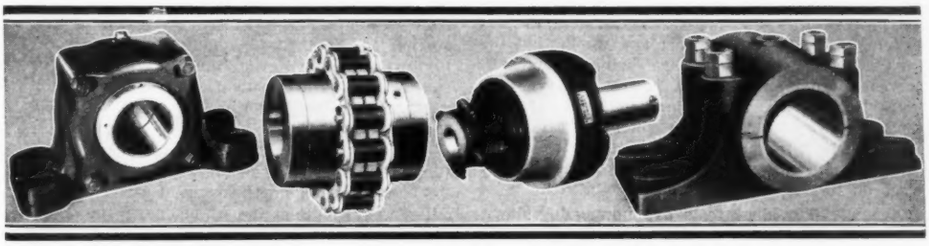

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West and North Texas

By
L. E. BREDBERG

NEW POOL IN ECTOR COUNTY; NOTABLE FLUSH PRODUCTION

FORT WORTH, Tex., Mar. 22.—West Texas activities, leasing, blocking, wildcatting and field drilling are continuing at a fast pace. The district is twice as busy as it was during the previous boom in 1926-28. The northern tier of counties, including Bailey, Terry, Cochran, Yoakum, Hockley and Lubbock, are witnessing continued leasing. Several new wildcat locations were staked in four of these counties within the past two weeks and the proposals to drill others are being considered. Reeves County, on the west, is the scene of considerable leasing, companies and independents taking acreage in that county, in which several blocks have been held by majors for several years, which may be tested this year prior to expiration of the leases on them.

Around 70 wildcat tests are now going down in West Texas, with a number shut down.

Crane Discovery

Clark, Cooper & Smith No. 1 Jordan, section 12, Block B-22, P.S.L. Survey, near the Ector County line in northern Crane County, and about 4 miles northwest of the Waddell field, opened another producing area, which may later prove a part of the Waddell field when intervening tests are drilled. The well is bottomed at 3,750 feet, showing oil and gas at 3,590-3,610 feet, which saturated streak was given a 100-quart shot and then an acid treatment with 3,000 gallons after bridging back to 3,683 feet. It pumped 50 bbls. of oil in 12 hours, but pumped off. It is a small producer at the present, but further treating may increase its production.

Bennett Boosted

The new Bennett field in the southeastern corner of Yoakum County, discovered about a year and a half ago, was given a boost when the second well, Texas Pacific Coal & Oil Co. No. 1 Ruth Bennett, in section 678, Block D, John H. Gibson Survey, about one-half mile north of the discovery well, flowed as high as 60 bbls. per hour after treating, through open tubing. During the first 13 hours on test it flowed at the rate of 28 bbls. per hour through five-eighths inch choke, flowing 48 bbls. the fourteenth hour when opened and 60 bbls. the fifteenth hour, open. It was then put back on five-eighths inch choke, flowing 30 bbls. per hour before shutting in on account of lack of storage.

In January this well was completed flowing 572 bbls. naturally at a total depth of 5,236 feet, the discovery well produced at a total depth of 5,280 feet, plugged back from 5,306 feet.

Deepening the new well, shooting with 380 quarts of nitroglycerin at 5,090-5,275 feet and acidizing with 5,000 gallons of acid nearly tripled its previous natural performance, giving the area greater potentialities and no doubt leading to other new tests on offset acreage in the near future, although until there is a pipe line outlet developments will be curtailed. The pool is about 30 miles from the nearest pipe line, which is Humble Pipe Line Co.'s line into the Means field in northeastern Andrews County. This company may later lay a line from this field to the two producing areas near Seminole in Gaines County and thence up to the Yoakum County field, but no such plans have been announced.

Andrews Extensioner

Shell Petroleum Corp. No. 1 E. F. King, in the SE cor. of section 10, Block A-42, P.S.L. Survey, 1 mile west of a lone producer in section 6 and about 2½ miles north of the Fuhrman field in southern Andrews County, and about midway between that field and the Kuykendall field to the north, was completed this week pumping 330 bbls. of oil on a 24-hour proration test. It topped the pay at 4,445 feet and total depth is 4,486 feet.

C. L. Peters and A. Hargrave made location this week for a wildcat in the eastern part of Andrews County. It is in the northwest quarter of section 10, Block A-44, about 3 miles east of the producers on the Parker lands, and about 7 miles southwest of the Means field. E. Russell Lloyd, consulting geologist of Midland, assembled the block and geologized the area.

Amon G. Carter moved in rig on the A. L. Wasson and other lands, in section 48, Block AX, P.S.L. Survey, in northwestern Gaines County, 15 miles west of Seagraves and near the Yoakum County line.

Another wildcat location for the week was that of Choate & Hogan on the C. B. Haun lands, in section 88, Block 1, I.&G.N. Survey, northwestern Crockett County. It is located on a block of 2,500 acres and is scheduled to go to 2,500 feet.

The Humble Oil & Refining Co. staked location in the Toborg-Tippett field in Pecos County. Its No. 2 Tippett in section 537, T.I.&.M. Survey, about 1½ miles northwest of No. 1 Tippett, abandoned a couple of weeks ago at a total depth of 1,220 feet after striking sulfur water.

Taylor Discovery

L. Dunn and Herman McAllister, both of Abilene, appear to have a discovery in the making in No. 1 Bowles Estate, in section 28, Blind Asylum Lands, about 6 miles northeast of Abilene in the northwestern corner of Taylor County. The test topped saturated sandy lime at 1,750 feet and was shut down 2 feet in the pay, oil rising in the hole at the rate of 200 bbls. per day. The well, it is believed, will be good for 25 bbls. per day on the pump, which is now being installed. Gravity of the oil tested 45.5 degrees, and is light green in color. The owners have made tentative location for a second test on the block, about one-half mile south of the discovery, but on the Wendell Foreman lands.

Charles W. Sanger, who has drilled 14 wildcats in the county, none of which proved a commercial producer, has a block of some 2,800 acres west and northwest of this new strike and will drill a test at once. Another wildcat in the county will be Brown Eagle Oil Co. and S. B. Roberts Drilling Co. No. 1 J. W. Harris lands, in the Thomas Johnson Survey, about 4 miles west of the new strike.

Three more locations for wildcats were staked in Jones County, in the Central Texas district, this week, while at the same time four such tests were abandoned as dry. One of the new wildcats will be located 3 miles east of Nugent and be drilled in section 9, Block 14, T.&P. Survey, by the Petroleum Producers. Fain-McGaha Oil Corp. will drill in section 55, O. A. Lands, 3 miles northwest of the Sandy Ridge pool and R. B. Farris and others will drill in the W. T. Evans Survey, 3 miles south of Nugent. A. J. Riddle, Trustee is drilling on the Freeman and others lands in section 6, Block 17, T.&P. Survey, about one-half mile north and then east of a dry hole abandoned on the T. Bumpass lands a week ago. Total depth of that test was 2,635 feet. This new test may be carried to 3,000 feet if commercial production is not obtained at 2,600-foot contract depth.

NORTH CENTRAL TEXAS

The wildcat Ordovician test of the Seaboard Oil Corp. on its large block in the Fairy Community in Hamilton County, 9 miles north of the county seat, Hamilton, and located in the A. C. Grimes Survey, has been abandoned after plugging back from a total depth of 4,438 feet, where it struck water, to 4,194 feet and acidized with 3,000 gallons. This was the third test drilled in the county by the company in two years, the former two, about 12 miles northwest of Hamilton, were gassers from the Marble Falls lime.

The Lion Oil & Refining Co. will soon move in rig on its block about 5 miles northeast of the town of Bryson in Jack County, and near an old test abandoned in 1929 after getting a good showing of oil in the Bryson horizon of the Strawn series at 3,450 feet. Total depth was 3,674 feet.

An outpost location has been staked in the Bryson area, Jack County, by the Bryson Oil & Gas Co. on the E. G. Turner lands, in the Allbritton Survey. It is 2 miles north and three-quarters of a mile east of the north pool. About 4 miles north of Bryson, Leidecker and Padgett have staked location on the J. W. Padgett Estate, in the Allbritton Survey, about one-half mile directly east of the old Bryson Oil & Gas Co.'s production. H. K. Kiddle has made location on the M. K. Graham lands, in the W. C. Hunt Survey, between Young County production and production in the north pool of Bryson.

Stephens Strike

Six miles southeast of Ivan in Stephens County, W. T. Garrett and others No. 1 Echols, in section 10, Block 3, S.P.R.R. Survey, logged sand at 3,865-73 feet and tested 16,750,000 feet of gas. The operators are now cementing casing preparatory to testing and carrying deeper in quest of oil. The well is being closely watched by many interested in deeper drilling in the area.

The Denver Producing & Refining Co., headed by Hugh Rapp, who holds an interest in the Collinsville discovery in southwestern Grayson County, and which will soon start another test near that discovery in the Quillen Survey, will stake location at once for a wildcat in northern Cooke County, in Tract 3, W. G. Hunt Survey, on a block assembled by J. W. Dutton and W. C. Bonney of Oklahoma City. It is to drill to 3,500 feet.

Ruble and Lowery will probably abandoned their No. 1 Dozier, in Block 12, Fannin County School Land Survey, in eastern Cooke County. It is now shut down at 3,062 feet without a showing of oil or gas. It is about a mile west of the old producer on the B. W. Davis lands, in the same survey.

Seven miles northwest of Sherman, in Grayson County, a block of 6,000 acres centering in the H. Persons Survey, has been taken, with a reported contract for a 3,500-foot test, to be spudded by May 1. Joe Engberg and Cecil Peterson of Oklahoma, are reported to have assembled the block.

PANHANDLE

The Stansylvania Oil Co. did not have a chance to complete its No. 1 C. B. Lasater, in section 27, Block M-23, T.D.R.R. Survey, an extensioner to the Dolomite area, about 1¼ miles northwest of the nearest production in the Stinnett area in West central Hutchinson County, before getting an offer for the lease, the north half of the section. It was sold to the Phillips Petroleum Co. for a reported $160,000 cash payment plus a $40,000 oil payment, the purchasing company to complete the well and drill three more on the lease. The well logged the first saturation at 3,175-85 feet

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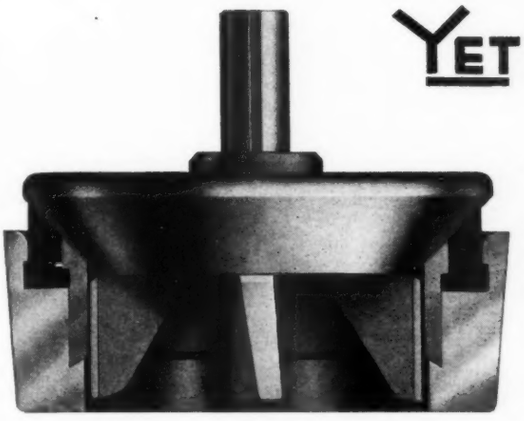

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First, this valve provides two positive leak-proof seats on the valve body inserts. The first seal is on the rubber insert, which absorbs the shock and compresses until the valve is fully seated and cushioned on both rubber and steel. This avoids pounding, and insures that the valve will give many more hours of service before any replacement becomes necessary. Next, the valve cannot seat in exactly the same place twice due to the force of fluid on the guides changing the position of travel of the valve.

And don't forget this: The TWIN-SEAT Valve costs no more than ordinary pump valves in spite of its superior features not found elsewhere!

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and showed an increase at 3,190 feet. Elevation is 3,305 feet. Total depth is 3,265 feet.

Wildcat Location

E. E. Seward staked location for a wildcat on the Wynne lands in section 26, Block 47½, H.&T.C. Survey, in Dallam County, about 3 miles northeast of a previous test abandoned at 2,865 feet, and approximately 16 miles northeast of Dalhart.

H. C. Robinson of Oklahoma City and Frank Stockton of Bethany, Okla., are preparing to drill a 4,000-foot wildcat 3 miles north of the town of Wheeler in the county of that name. Location is in the SE quarter of section 35, Block A-4, H.& G.N. Survey, on the S. T. Morgan lands. It is to spud by April 1, lease expiration forcing spudding by that time.

Sixteen locations were staked in the Panhandle district this week, this district gaining in activity as are nearly all other districts in the state.

WEST TEXAS COMPLETIONS

Crane County

Enniscrane Oil Co. No. 2-A Hughes, 2,119-20 feet, acidized, 500 bbls. on pump. Humble Oil & Refining Co. No. 7 Tubbs, 4,290-4,420 feet, acidized, 4,756 bbls.

Ector County

Devonian Oil Co. No. 1-B Scharbauer, 4,155-4,212 feet, acidized, 3,735 bbls. Landreth Production Co. No. 1-F Scharbauer, 4,166-4,224 feet, acidized, 1,552 bbls.

Glasscock County

Continental Oil Co. No. 25-S Settles, 1,228-72 feet, 363 bbls. on pump.

Howard County

Ennisbrook Oil Co. No. 12 Texas Land & Mortgage Co., 2,630-2,804 feet, 550 bbls. on pump.

Jones County

Fain-McGaha and others No. 1 Lotspeich, dry and abandoned, 2,325 feet; No. 1 Lewis, junked and abandoned at 1,565 feet. Sandy Ridge Oil Co. No. 7 Jones, 1,932-44 feet, shot, 92 bbls. on pump. Danciger and others No. 2 Guitar, trustee, 1,989-2,005 feet, treated, 483 bbls.

Upton County

Continental Oil Co. No. 4 Reese, 2,565-2,634 feet, acidized, 624 bbls. on pump; No. 5 Reese, 2,537-2,737 feet, acidized, 584 bbls. Cordova-Union Oil Co. No. 4-A fee, 2,023-65 feet, acidized, 234 bbls. on pump. D. L. Hunter No. 3 Robbins, 2,188-96 feet, acidized, 969 bbls. on pump. Humble Oil & Refining Co. No. 5 Reese, 2,515-2,648 feet, acidized, 47 bbls. per day on pump.

Pecos County

P. Childress, trustee, No. 16 Smith, 334-58 feet, 72 bbls. on pump. A. R. Forester No. 1 Fromme, dry and abandoned, 1,723 feet, elevation 2,432 feet. Humble Oil & Refining Co. No. 1 Tippett, dry and abandoned 1,220 feet, elevation 2,215 feet.

Ward County

F.H.E. Oil Co. No. 5-C Richter, 2,864-2,966 feet, shot, 2,913 bbls. Gulf Oil Corp. No. 15 Estes, 2,500-2,620 feet, shot, 1,240 bbls.; No. 80 O'Brien, 2,544-2,759 feet, shot, 721 bbls. Pat Hill No. 12 Clements, 2,253-2,326 feet, shot, 267 bbls. Jack Leidecker No. 6-A Archenhold, 2,950-3,051 feet, shot and acidized, 471 bbls. on pump. A. E. Lynch No. 2-B Himmel, 2,270-2,388 feet, shot, 420 bbls.. Richardson Oils, Inc., No. 18 Hathaway, 2,496-2,675 feet, shot, 3,272 bbls. Sid Richardson No. 14 O'Brien, 2,720-3,106 feet, shot, 377 bbls. Rio Bravo Oil Co. No. 17 Olcott, 2,250-2,453 feet, shot, 446 bbls.

Winkler County

Atlantic Refining Co. No. 2 Lovett, 2,748-3,116 feet, shot, 786 bbls. Emperor Oil Co. No. 2 Hess, 3,050-69 feet, 5,393 bbls. Bert Fields No. 4 Pure-Clapp, 2,747-3,116 feet, shot, 1,904 bbls. Gulf Oil Corp. No. 24 Daugherty, 2,830-3,020 feet, shot, 1,292 bbls. Humble Oil & Refining Co. No. 13-A Colby, 2,813-3,015 feet, shot, 785 bbls.; 8-C Colby, 2,810-3,052 feet, shot, 563 bbls.; 24 Howe, 2,850-3,127 feet, 432 bbls. shot.

Illinois Oil Co. No. 11-B Central State Bank of Abilene, 2,777-3,140 feet, shot, 1,108 bbls.; Magnolia Petroleum Co. No. 10 Scarborough, 2,870-2,982 feet, shot, 133 bbls.; No. 59 Walton, 2,750-3,000 feet, shot, 887 bbls.; No. 5 State-Walton, 2,805-2,919 feet, shot, 362 bbls.

Mid-Continent Petroleum Co. No. 15 Walton, 2,795-2,960 feet, shot, 875 bbls. Phillips Petroleum Co. No. 3 McCabe, 2,727-2,948 feet, shot, 157 bbls. Sayre Oil Co. No. 6-C Howe, 2,800-2,989 feet, shot, 116 bbls. Shell Petroleum Corp. No. 1-M Hendrick, 2,817-3,090 feet, shot, 509 bbls. Sinclair-Prairie Oil Co. No. 16-B Walton, 2,872-2,975 feet, shot, 1,400 bbls.

PANHANDLE COMPLETIONS

Carson County

McGill and others No. 6 Cooper, 2,961-3,028 feet, shot, 682 bbls. on pump. Skelly Oil Co. No. 83 Shafer ranch, 2,993-3,085 feet, shot, 908 bbls. on pump. Magnolia Petroleum Co. No. 21 fee, 2,970-

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3,020 feet, shot, 751 bbls. on pump. Huber Petroleum Co. No. 6 Burnett, 2,700-2,965 feet, 24,314,000 feet gas. The Texas Co. No. 6 Boney, 2,955-3,038 feet, shot, 739 bbls. on pump.

Gray County

Alma Oil Co. No. 3 Kretzmier, 3,277-86 feet, shot, 252 bbls. on pump. Magnolia Petroleum Co. No. 10 Haggard, 3,245-3,320 feet, shot, 621 bbls. on pump. Doniphane Oil Co. No. 2 Cobb, 3,220-3,381 feet, shot, 448 bbls. on pump. Stanolind Oil & Gas Co. No. 3 Binkley, 3,131-3,291 feet, 580 bbls. on pump. The Texas Co. No. 11 Davis, 2,695-2,800 feet, 579 bbls. on pump.

Hutchinson County

Barnsdall Oil Co. No. 4 Lewis, 2,870-3,012 feet, shot, 1,030 bbls. on pump. W. W. Holmes No. 1 Lyall, 2,682-2,740 feet, shot, 552 bbls. on pump. Phillips Petroleum Co. No. 3 Haile, 3,030-82 feet, shot, 426 bbls. on pump; No. 4-A Moore-Timms, 3,041-3,109 feet, shot, 436 bbls. on pump. Skelly Oil Co. No. 5 Watkins, 2,917-50 feet, shot, 547 bbls on pump. Harvester Oil Co. No. 5 Haile, 3,040-80 feet, shot, 639 bbls. on pump. Owl Oil Co. No. 5 Moore, 3,069-3,108 feet, shot, 676 bbls. on pump.

Moore County

Magnolia Petroleum Co. No. 4 Britain, 2,697-2,940 feet, 79,379,000 feet of gas.

Wheeler County

Allender & Heare No. 1 Harvey, dry and abandoned, 2,200 feet. Alma Oil Co. No. 3 Perkins, dry and abandoned, 2,610 feet. Skelly Oil Co. No. 1 Perkins, 2,400-70 feet, 308 bbls.

NORTH TEXAS COMPLETIONS

Archer County

L. T. Burns No. 1 Perkins E, 1,025 feet, dry. John Chambers No. 1 Wilson, 655 feet, dry. W. L. Clum No. 2 Lasater B, 1,275 feet, dry. Golding & Cochran No. 2 Jeske B, 1,178-87 feet, 125 bbls. R. O. Harvey No. 3 Kinder, 1,233 feet, dry. W. T. Hutcheson, Jr. No. 1 Wilson D, 845 feet, junked. Sussex Oil Co. No. 1 Wilson, 1,872 feet, dry.

Clay County

Bridwell Oil Co. No. 4 Saner, 212-17 feet, 30 bbls.; No. 5 Saner, 300 feet, dry.

Cooke County

Hester Oil Co. No. 4-A R. W. Trew, 1,112-29 feet, 10 bbls. Mack Oil Co. No. 4 Felderhoff, 750 feet, dry. Mudge Oil Co. No. 17 Johnson, 1,146-95 feet, 10 bbls. Ruble & Lowry No. 1 W. L. Dozier, 3,602 feet, dry. Schermerhorn Oil Co. No. 9 Hess, 786-880 feet, 35 bbls. Texas Co. No. 10 H. L. Dennis, 1,210-22 feet, 55 bbls.

Grayson County

O. T. Clark No. 1 J. C. Mulder, 610 feet, dry.

Jack County

Bennett Petroleum Co. No. 7 Chambers, 2,930-90 feet, 1,100 bbls.; No. 6 Mrs. D. C. Clayton, 2,975-3,030 feet, 290 bbls. Cato Oil Co. No. 3 J. A. Raley A, 2,956-3,072 feet, 476 bbls. Cockburn & Boaz No. 1 Bryson School, 3,006-21 feet, 525 bbls. Deep Oil Development Co. No. 2 Bridwell, 2,948-3,080 feet, 125 bbls. Gillespie & Perrin No. 1 L. J. Hester, 2,907-58 feet, 50 bbls. Hammond & Meredith No. 4 F. H. Rhodes, 2,366-84 feet, 100 bbls. Hanlon-Buchanan, Inc. No. 2 E. M. Sampley, 3,007-23 feet, 335 bbls. L. Hedrick No. 1 Brown, 3,035 feet, dry. T. D. Humphrey No. 3 M. B. Cooke, 2,900-3,004 feet, 40 bbls.; No. 4 M. B. Cooke, 2,949-64 feet, 325 bbls.; No. 1 Smith, 2,925-90 feet, 450 bbls. Josaline Production Co. No. 5 R. H. Easterly, 2,964-3,007 feet, 500 bbls.; No. 6 R. H. Easterly, 2,951-3,001 feet, 495 bbls. Lawson & Kistler No. 2 C. C. Chambers, abandoned location. Owenwood Pool No. 3 Well No. 1 S. M. Jones, 3,014-3,128 feet, 350 bbls.

Montague County

Arco Oil Co. No. 6 Mrs. M. H. Salmon E, 1,635-48 feet, 125 bbls.; No. 7, 1,563-1,642 feet, 110 bbls. Bridwell Oil Co. No. 4 Mrs. S. F. Loy B, 1,758-1,764 feet, 150 bbls. Continental Oil Co. No. 32 Cunningham A, 924-48 feet, 45 bbls. Sinclair Prairie Oil Co. No. 5 C. Holt, 1,644-79 feet.

Wichita County

C. L. Apple No. 12 Jennings, 1,865 feet, total depth, plugged back to 1,820 feet, oil sand 1,781-1,820 feet, 5 bbls. Bohner and others No. 15-A R. J. Brannon, 1,701-31 feet, key well. Fresno Oil Co. No. 23 Ramming A, 1,303-23 feet, 15 bbls. J. E. Keller No. 4 Waggoner, 559 feet, dry. King Oil Co. No. 2 M. M. Stone A, 1,619-36 feet, 200 bbls.; No. 15 Waggoner H, 1,934-44 feet, 150 bbls. W. B. Omohundro No. 7 Whittenbach A, 2,015-19 feet, 25 bbls.

Wilbarger County

E. C. Lawson No. 1 Waggoner B, 1,496-1,504 feet, 20 bbls.

Young County

King Oil Co. No. 6 C. W. Johnson B, 498-510 feet, 5 bbls. C. E. Knox and others No. 2 Worsham, 2,700-25 feet, 20 bbls. E. Lennington No. 1 M. K. Graham, 873 feet, dry. C. J. Mason and others No. 1 M. F. Wells, 785 feet, dry. Pitzer West and others No. 2 Norton Properties, 3,850-3,900 feet, 1,550 bbls. Sam Simmons No. 1 Simmons, 576 feet, dry. Texas Co. No. 2 Stephenson, 4,055-90 feet, 650 bbls.

CENTRAL TEXAS COMPLETIONS

Hamilton County

Seaboard Oil Corp. No. 1 fee, 9 miles north of Hamilton, 4,438 feet, dry and abandoned, plugged back to lime 4,144-94 feet and treated with 3,000 gallons acid solution.

Jones County

Fain & McGaha Oil Corp. No. 1 Lotspeich, total depth 2,325 feet, dry and abandoned. R. B. Farris and others No. 5 Guitar, lime 1,987-2,008 feet, 102 bbls. per day. Hostetter & Favor No. 1 Favor, total depth 2,082 feet, dry and abandoned. Hugh King, Jr. and others No. 1 Harris, 2,205 feet, dry and abandoned. N. H. Martin & Son No. 1 Hayden, total depth 2,548 feet, dry and abandoned.

Shackelford County

Baker & Pardue No. 3 Davis B, 1,396-99 feet, 22 bbls. W. E. Butler No. 10 Morris, 1,597-1,608 feet, 140 bbls. S. B. Owens and others No. 8 Morris, 1,593-1,610 feet, 160 bbls. Frank Oyster and others No. 1 Swenson, total depth 1,946 feet, dry and abandoned.

Throckmorton County

Canyon Oil & Gas Co. No. 1 Huckabee, total depth 387 feet, dry and abandoned.

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East and East Central Texas

By L. E. BREDBERG

WORK IN TALCO INCREASES; SALT WATER IN EAST TEXAS

DALLAS, Tex., Mar. 22.—Reports have come from the field that a couple of Trinity sand tests are slated to be drilled along the east side of the East Texas field's producing area within the near future, but so far nothing definite has been obtained in regard to these, such as tentative locations.

The G. R. C. Oil Co. of Houston has been assigned a block of 13,000 acres around Tatum, in the northeastern part of Rusk County, and a Glen Rose test is expected to be started within the next 120 days. However, this block is some distance from the East Texas field and therefore would have no bearing on the producing potentialities of the Glen Rose in that field. Companies are busy leasing and taking extensions on other leases along the east flank of the East Texas field for protection when Glen Rose tests are drilled along the flank.

Trinity Test

C. F. Lytle, of Sioux City, Iowa, who, a year ago, drilled a Trinity sand failure near Mexia in the old field of that name in Limestone County, has staked location for another deep test along the fault plane. This location is on the R. Simmons farm, in the R. B. Longbotham Survey, 1 mile south of Wortham, in Freestone County. The test is to be drilled to the Lower Glen Rose. There are seven old Woodbine sand producers remaining in the Wortham field which has been producing a little over 11 years from the Woodbine horizon.

Another location for Freestone County this week was staked by Stroude & Buzzard on the P. Miller farm, in the R. D. Sloan Survey, 6 miles northeast of Fairfield. A reported Trinity test for the eastern part of the county will be drilled on the old Kirven-Simsboro Woodbine structure if plans materialize. Don S. Foster, T. J. Tucker and Ben B. Hunt of Mexia, and Stewart Brothers and Watson of Fairfield, have blocked some 8,000 acres in that area, about 4 miles northwest of Teague. Four Woodbine sand tests all failed to find production in that horizon.

A Woodbine sand test is to be sunk by J. G. Mayo Oil Co. on the J. T. Greenwood farm, in the C. Parks Survey No. 295, Cherokee County, 4½ miles west of Lane Store and 2,500 feet southeast of a former test which proved dry. Rig is now being moved in on location. The Winnsboro area in Wood County is due for another test. B. F. Phillips is rigging up on the L. E. Pritchard farm, in the T. Craddock Survey, 4 miles south of that town. It will probably go only to the Woodbine.

The Trinity sand test of the Tide Water Associated and others, on the McElreath and Suggett lands, in the W. P. Wyche Survey, 1½ miles northwest of Opelika in Henderson County, drilled Austin Chalk at 3,710-4,110 feet, logged top of the Woodbine at 4,137 feet, the sand at 4,204 feet and is drilling ahead below 4,700 feet. Elevation is 394 feet. This is now the most closely watched test in the district, practically all other deep tests in the district having proven dry, including the one of J. Z. Werby and others on the Strutton farm, in M.E.P.&P.R.R. Survey, 2 miles east of production in the Talco field, Titus County. It is now standing shut down at 6,214 feet, 14 feet past contract depth. Elevation is 341 feet.

Talco Field

There were 11 locations staked in the Talco field last week, and five wells were completed within the same period. Activities are picking up in this field, there now being 54 wells drilling or preparing to drill. Operators in the Sulphur Bluff field are cautiously drilling extension wells to prevent overstepping the producing limits of the field, the northern side already having been practically defined by wells drilled near the fault. The field is expected to be narrow, not over three-quarters of a mile in width, consequently caution is being used in staking locations to the south. Four wells were completed in the past week, the best one flowing 428 bbls. in 24 hours through one-quarter inch tubing choke. W. Goldston drilled this test, No. 5 Smith, on the east side of the field.

Since the Railroad Commission's last report on the salt water situation in the East Texas field, made October 1, 1936, salt water has increased by a little over 6,500 bbls. per day. That report showed a daily average of 42,885 bbls. whereas the latest report, made January 1, 1937, showed 46,327 bbls. produced. Previously only 2,081 wells were making various amounts of water, whereas now there are 2,184 wells making water, averaging nearly 21½ bbls. per day. There are 2,902 wells pumping and 314 wells produced by air or gas lift. There are about 450 more wells on production now than when the last water report was made.

EAST TEXAS COMPLETIONS

Gregg County

Barnsdall Oil Co. No. 17 Adam, 3,569-76 feet, 60 bbls. per hour. Gilcrease Oil Co. No. 9 A. Christian, 3,572-3,602 feet, 60 bbls. per hour. Lechner & Hubbard No. 5-A Doby, 3,570-90 feet, 100 bbls. per hour. Margay Oil Co. No. 10 R. Corbin, 3,543-63 feet, 48 bbls. in 30 minutes. Shell Petroleum Corp. No. 8 B. Moore, 3,536-96 feet, 20 bbls. in 15 minutes; No. 10 Knowles, 3,657-63 feet, 36 bbls. per hour.

Sinclair Prairie Oil Co. No. 17 York, 3,556-57 feet, 60 bbls. per hour; No. 8 Thomas, 3,720-21 feet, 20 bbls. per hour. Stanolind Oil & Gas Co. No. 52-B McKinley, 3,558-3,605 feet, 54 bbls. per hour. L. W. Callender and others No. 18 Walker, 3,589-90 feet, 16 bbls. per hour. Gulf Oil Corp. No. 18 Strong, 3,675-78 feet, 60 bbls. per hour. Humble Oil & Refining Co. No. 18 Thomas, 3,565-96 feet, 40 bbls. per hour.

Sun Oil Co. No. 29 Hilburn Lloyd, 3,646-55 feet, 10 bbls. per hour through three-eighths inch choke. The Texas Co. No. 9 Dickson, 3,587-94 feet, 75 bbls. per hour. Tide Water Associated No. 17 Blackman, 3,650-54 feet, 47 bbls. per hour; No. 14 Lacy, 3,543-63 feet, 60 bbls. per hour. Welch & Sandler No. 10 Barnett, 3,730-42 feet, plugged back to 3,731 feet, 20 bbls. per hour, 50 per cent salt water.

Rusk County

Geir Brothers and others No. 5 Williamson, 3,710-29 feet, 80 bbls. per hour. Gulf Oil Corp. No. 10 Terrell, 3,611-16 feet, 45 bbls. per hour through three-quarter inch choke. Karona Oil Co. No. 6 Peterson, 3,623-24 feet, 60 bbls. per hour. Hammond Oil Co. No. 4 Holt, 3,499-3,563 feet, 20 bbls. in four hours on pump.

Humble Oil & Refining Co. No. 48-A Plowman, 3,660-3,712 feet, 60 bbls. per hour. Manahan Oil Co. No. 16 Neal, 3,804-05 feet, 12 bbls. in 15 minutes. Stanolind Oil & Gas Co. No. 13 Mason, 3,590-3,616 feet, 36 bbls. per hour. Tide Water Associated No. 3-A Hale, 3,598-3,647 feet, 15 bbls. in 30 minutes. Willard Oil Co. No. 5 Alford, 3,626-54 feet, 150 bbls. in two hours.

Upshur County

O. R. Cooper No. 5 Florence, 3,750-51 feet, 6 bbls. per hour on pump, 6 per cent water. B. F. Phillips No. 1 Douphrate, 3,756-57 feet, 30 bbls. per hour. Sam Siegel No. 2 Reed, 3,677-78 feet, 25 bbls. per hour through 1-inch choke. Texfield Oil Co. No. 3 O. J. Phillips, 3,728-29 feet, 20 bbls. per hour on pump; No. 4 Phillips, 3,720-21 feet, 20 bbls. per hour on pump. United East & West Oil Co. No. 7 Shelton, 3,695-3,709 feet, 35 bbls. per hour.

Smith County

V. E. Kirkland No. 2 Green, 3,823-24 feet, 35 bbls. in 30 minutes. Sun Oil Co. No. 2 Patterson, 3,735-36 feet, 20 bbls. per hour. G. C. Walters No. 4 Cross, 3,676-77 feet, 30 bbls. per hour.

EAST CENTRAL TEXAS COMPLETIONS

Franklin County

Humble Oil & Refining Co. No. 2 P. J. Dawson, total depth 4 352 feet, plugged back to 4,260 feet, 150 bbls. per day on pump.

Hopkins County

Empire Oil & Refining Co. No. 3 Worsham, 4,548 feet, 159 bbls. in 24 hours through one-quarter inch choke. W. Goldston No. 5 Smith, 4,549 feet, 428 bbls. in 24 hours through one-quarter inch choke. F. D. Jones No. 8 J. K. Pierce, 4,507 feet, 65 bbls. per hour; No. 10 Pierce, 4,521 feet, 59 bbls. per hour.

Titus County

W. B. Hinton and others No. 2 Hargrove-McLean, 4,316 feet, 21 bbls. per hour, Humble Oil & Refining Co. No. 1 J. Hargrove, 4,333 feet, 278 bbls. in 24 hours on pump; No. 31 King, 4,326 feet, 314 bbls. in 24 hours, on pump. Magnolia Petroleum Co. No. 5 K. Mainard, 4,235-4,307 feet, 328 bbls. in 24 hours on pump.

Galvestonites Protest

A hearing on the application for a permit to drill in the Gulf of Mexico which was made last week by the Humble Oil & Refining Co. was held at Galveston before United States army engineers March 15, and the testimony of the hearing has been transferred to the chief of engineers at Washington for a decision.

The application has been opposed vigorously by civic organizations at Beaumont, Galveston, Port Arthur and Houston on the grounds that the proposed structure would menace navigation and that the waste oil would destroy fish life as well as the bathing beaches. Under specifications on file the company proposed to erect a derrick in the Gulf of Mexico offshore from Jefferson County about a mile. Plans call for a derrick structure and platform 60 feet wide and 90 feet long at an elevation of 14 feet above mean low tide, supported on timber piling foundation. Officials representing Humble Oil & Refining Co. brought out the methods used in drilling in the Pacific Ocean and in inland bays in Coastal Louisiana and which has not caused pollution. Many affidavits and exhibits accompanied the company's testimony.

Oppose Marginal Well Bill

LONGVIEW, Tex.—The East Texas Independent Petroleum Association has been organized to fight any effort to cut allowables in the East Texas field.

M. T. Flanagan was chosen president: Sam Ross, Kilgore, vice president, and John J. Thomas, East Texas Refining Co., secretary-treasurer.

Five regional vice presidents elected were Walter Moore of Overton; Ben Phillips, Gladewater; Bryan Payne, Tyler; John Alford, Henderson, and H. P. McGaughey, Gilmer.

To the bereaved families
in the New London area, I
extend the deep sympathy of
the entire Baker Organization.
R. C. Baker

MATAGORDA PROMISED NEW MAJOR FIELD NEAR PALACIOS

By
F. L. SINGLETON

HOUSTON, Tex., Mar. 22.—With the first information released on the "mystery" test of Glenn H. McCarthy No. 1 Foley, north of the town of Palacios in Matagorda County, all indications point to the opening of a major field. The hole is bottomed in 30 feet of oil sand at 8,585 feet and a 7-inch production string is being cemented on bottom, preparatory to testing through perforations.

From the results recorded on a Schlumberger survey, a total of 18 sands showing oil and gas have been encountered within a 939-foot section of the Frio horizon. The first showing was encountered at 7,646-56 feet and the balance were recorded at intervals to the total depth. Four distinct oil sands were shown at 7,834-40 feet, 7,855-67 feet, 7,875-95 feet, 8,205-16 feet, and 8,555-85 feet. Perforations are to be made in the section at 8,555-85 feet which has a gas cap of 61 feet immediately above.

This test is located in the Suzan Perkins Survey and has attracted wide attention setting off an extensive leasing and royalty-buying campaign which has resulted in the area being divided into many ownerships, the majority held by independents. A most active drilling campaign will result should the test make a good producer.

Other developments along the Texas Coast were confined to proven fields, where several extensions were being made. In the Lockridge field, Shell Petroleum Corp. No. 2 Ramsey Prison Farm, about 1,700 feet east of production, was being completed at 6,370 feet, after it showed 2,000 feet of pipe line oil on a drill stem test at 6,365-70 feet. Seven-inch casing was cemented at 6,350 feet. Offsetting the discovery well, Gulf Oil Corp. No. 1 Carrie Baker, is bottomed at 6,358 feet and is being tested after 7-inch casing was cemented at 6,348 feet.

Good Well in Segno Field

Although it has not thoroughly cleaned itself of wash water, the second completion of the new Segno field in Polk County has the appearance of making a good well. Bottomed in the Upper Cockfield sand at 5,197 feet, with 7-inch casing cemented at 5,167 feet, J. K. Dorrance No. 2 Wing was flowing at the rate of 25 bbls. per hour through various chokes with tubing pressure 1,600 pounds and casing pressure 1,800 pounds. It extends production about 1,200 feet west. Location has been made for No. 3 Wing midway between the discovery well and Segno wells. Gulf Oil Corp. and Humble Oil & Refining Co. have started drilling operations on their two locations.

In the Cotton Lake field, Chambers County, Salt Dome Oil Corp. was running 7-inch casing to test No. 1-C Lawrence after an unsatisfactory drill stem test at 6,488-6,503 feet, the total depth, showed 200 feet of pipe line oil and 620 feet of oil cut mud. The casing will be cemented on bottom and the test made through perforations. This will be the third completion for the south extension area. The first two wells were distillate producers. In the same county, but in the Seabreeze field, Sun Oil Co. No. 1-A White was cleaning into pits through a one-eighth inch choke with tubing pressure 2,000 pounds and casing pressure 1,500 pounds. This is an old hole formerly drilled to 9,055 feet, and is being completed at a plugged back depth of 8,343 feet, the same producing horizon from which the company has two other wells producing distillate.

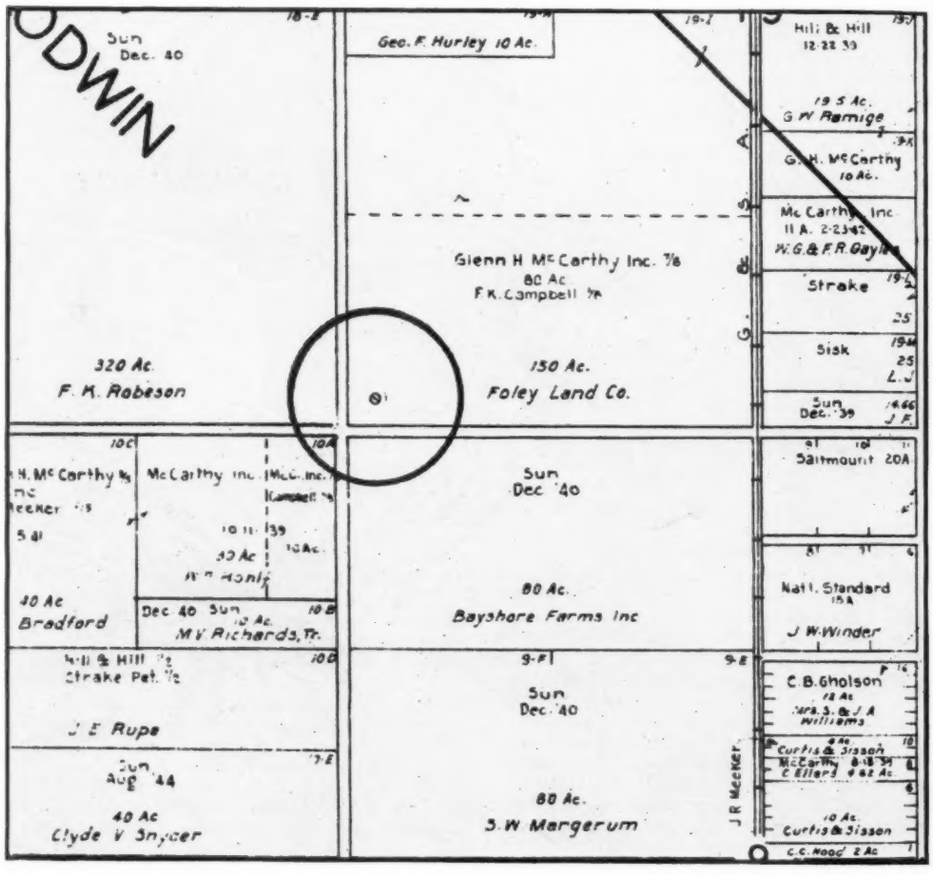
New Wells in Silsbee

Three new locations were made in the Silsbee field, Hardin County, by the Republic Production Co. and Houston Oil Co., following the completion of two additional wells. Locations were made for No. 9, 10 and 11 Brooks in the G. W. Brooks Survey. No. 6 Brooks flowed 423 bbls. per day through a quarter-inch choke with tubing pressure 675 pounds and casing pressure 955 pounds from the Lower Cockfield sand bottomed at 6,961 feet, while No. 8 Brooks flowed 181 bbls. of pipe line oil per day through a three-sixteenths inch choke with tubing pressure 1,750 pounds and casing pressure 923 pounds. Total depth of 6,970 feet.

The best producer to be completed in the West Beaumont field, Jefferson County, was Glenn H. McCarthy No. 3-B Longe, which flowed 15 bbls. per hour through a quarter-inch choke with tubing pressure 600 pounds. Production is from the 5,300-foot sand, bottomed at 5,389 feet, with 7⅝-inch casing cemented at 5,364 feet. To the south, at the Cheek Prospect, interest was centered on Humble Oil & Refining Co. No. 1 Jefferson Land Co. as preparations were being made for a production test through perforated casing at approximately 7,800 feet. This is the same sand from which the well attempted to blow out several weeks ago. Seven-inch casing was cemented at 8,162 feet and the hole deepened to 8,459 feet, where the drill stem stuck. The Frio was topped at 7,491 feet. East of Fannett on the Gilbert Ranch Prospect, David B. MacDaniel spudded No. 1 J. E. Gilbert in the J. Richard Survey.

Protest Against Ocean Drilling

A hearing on the application for a permit to drill in the Gulf of Mexico off shore from the McFadden Beach Prospect in Jefferson County, was held before United States army engineers at Galveston March 19th and a decision is expected at an early date. Protests from civic organizations and individuals at Galveston, Houston, Port Arthur and Beaumont opposed the plan on the grounds that the structure would menace navigation and that waste oil would destroy fishing and that bathing beaches would be polluted. Officials representing Humble Oil & Refining Co. stated that the land had been leased from the state for $101,000 and that the state would benefit as a result of the exploration. Methods used in drilling in the Pacific and around inland bays in Coastal Louisiana along with many affidavits and exhibits accompanied Humble Oil & Refining Co. testimony.



Palacios area, Matagorda County, showing location and ownership of leases around Glenn H. McCarthy No. 1 Foley which is running casing to test oil sand bottomed at 8,585 feet.—(W. W. Zingery, Maps, Houston)

Harris County Wildcats

Two wildcats in Harris County were holding attention. On the Aldine Prospect, Texas Gulf Production Co. No. 1 Gillespie and Garnsey located in the Simon Contreras Survey was drilling

ahead below 7,500 feet after two drill stem tests indicated production possibilities. The first test which was unsatisfactory, due to the tool slipping, showed 100 pounds of pressure in 9½ minutes at 7,074-7,104 feet and the second test showed 7 thribbles of gas-cut mud with a taste of distillate. The well is checking low on geological markers and was considered a failure last week when it tested salt water on a drill stem test at 6,925-71 feet. Stanolind Oil & Gas Co. No. 1 D. A. Oates located 4,150 feet south of the discovery well of the Clinton field in the C. Martinez Survey, topped a tight sand showing gas at 8,063 feet and is coring ahead below 8,067 feet. The discovery well blew out from a depth of 8,100 feet and was finally completed under extremely high gas pressures for a distillate well. No. 1 Oates is said to be checking lower on the structure than the discovery well, and if true, it has a good chance of making a producer.

The second gas well to be completed in the Spanish Camp gas field, Wharton County, was completed by Albert Plummer and Felmont Oil Corp. No. 1 Lyle Logue, 2,075 feet south of the discovery well in the D. Wade Survey. Seven-inch casing was cemented at 3,172 feet, and it is flowing gas and wash water with tubing pressure 1,260 pounds, through gun perforation at 3,015-20 feet. On the Hilje Prospect, L. P. Ogden Survey, Texas Co. No. 1 E. A. Wheatherer topped sand with an oil odor and a salty taste at 5,282 feet. On a drill stem test at 5,264-86 feet, it showed a light blow of gas and 1,000 feet of drilling mud and salt water with a slight oil odor and is drilling ahead below 5,500 feet.

In Fayette County, McNeil Petroleum Co. No. 1 Dybla, located in the A. Thompson Survey, topped the Jackson at 1,803 feet, Hockleyensis at 2,071 feet, Dibollensis at 2,812 feet and is drilling ahead in lime below 3,278 feet.

Coastal Louisiana

The completion of Continental Oil Co. and Gulf Oil Corp. No. 1 Hebert as a distillate producer for the discovery well of the Abbeville Prospect in Vermilion Parish, Louisiana, and the blow-out of a wildcat test at the North Starks Prospect in Calcasieu Parish were the outstanding developments along the Louisiana Gulf Coast.

Continental Oil Co. and Gulf Oil Corp. No. 1 O. C. Hebert, section 20-12s-3e, Abbeville Prospect, Vermilion Parish, is flowing 25 bbls. of 50 gravity distillate and 2,000,000 feet of gas daily through a three-sixteenth inch choke, with tubing pressure 2,800 pounds and casing pressure 2,300 pounds. Production was obtained by perforating the casing at 7,666-75 feet. This completion marks the end of the most interesting wildcat ever drilled in the district. It is the second deepest test in the world, having reached a depth of 12,216 feet where it found a sand showing oil and gas, but due to mechanical trouble, no successful test was ever made.

In the northwestern part of Calcasieu Parish, in section 1-8s-13w, D. D. Oil Co. No. 1 Lutcher Moore was being looked upon as a possible pool opener, due to a blow out that occured while coring at 8,398 feet, total depth. The gas pressure caused the drill stem to stick, and the operators are trying to recover it. This test is about 6 miles north of the Starks townsite on a block of about 5,000 acres that extends into Beauregard Parish. This is the second showing found, the first having been around 7,000 feet. The Discorbis was topped at 4,684 feet, Heterostegina at 4,826 feet, Frio at 4,961 feet, Vicksburg 6,728 feet, and the present showing is believed to be from the Cockfield sand, although no marker has been reported.

Preparations are being made by the Superior Oil Producing Co. to drill plug from a protection string of 7-inch casing cemented at 7,041 feet at No. 2 Leckelt, a proposed deep test on the west flank of the Jennings field in Acadia Parish. Plans were made to drill deeper after an electrical coring test failed to show the sands from which the company has several wells producing at various depths above the well's present total depth. Location is in section 42-9s-2w.

In the Lafitte field, Jefferson Parish, Texas Co. cemented 7-inch casing at 9,440 feet, preparatory to testing No. 6 Rigolettes at a total depth of 9,476 feet. Location is in section 29, about 1,935

(Continued on Page 214)

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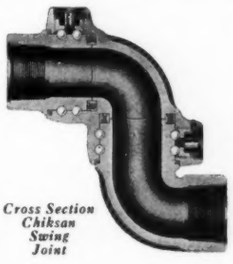

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ARKANSAS COMES BACK WITH NEW POOL IN UNION COUNTY

By MITCHELL TUCKER

SHREVEPORT, La., Mar. 22.—A probable new field opener in Union County, Arkansas, featured developments in the Ark.-La.-Tex. area last week. Lion Oil Refining Co. No. 1 Morgan, section 18-18-17, regarded an extreme wildcat on geophysically-mapped structure about 15 miles southwest of El Dorado and 8 miles north of the Louisiana line, indicated itself good for possibly 1,000 bbls. or more per day on original drill stem test made March 19. During the 15-minute drill stem test 38 gravity oil filled the drill stem through one-fourth inch choke and flowed over the casinghead from a porous and saturated sand member in what is presumed to be the Permian lime, Upper Paleozoic. Gas estimated 1,000,000 feet. Schlumberger electrical hole survey was made following recovery of saturated cores, and drill stem test made to test productivity. At this writing Lion officials were considering whether to set casing or continue testing.

Phillips Petroleum Co. drilled No. 1 Morgan to 4,270 feet last summer, and after topping the Travis Peak at 4,038 feet, and finding no attractive showings in the upper portion of this section, temporarily abandoned the hole at 4,270 feet. On a farm-out proposition whereby Phillips retained half interest, Lion Oil Refining Co. took over the block with agreement to carry the well to the 7,000-foot contract depth for thorough exploration of the Permian.

Estimated Daily Production

Estimated daily gross production all companies week ending March 19, 1937:

NORTH LOUISIANA

Bellevue	815
Caddo light	3,925
Caddo heavy	2,425
Converse	750
Cotton Valley heavy	325
Cotton Valley light	530
De Soto and Red River	1,380
Elm Grove	365
Haynesville	3,285
Holly	140
Homer	2,600
Lisbon	125
Pleasant Hill	140
Rodessa	47,605
Sarepta-Carterville	400
Sligo	395
Urania	2,800
Zwolle	720
Total	68,725

SOUTH ARKANSAS

Champagnolle	1,585
El Dorado	2,010
Lisbon	290
Miller County	550
Nevada	765
Smackover light	2,125
Smackover heavy	16,890
Stephens	560
Troy	950
Urbana	1,410
Total	27,135

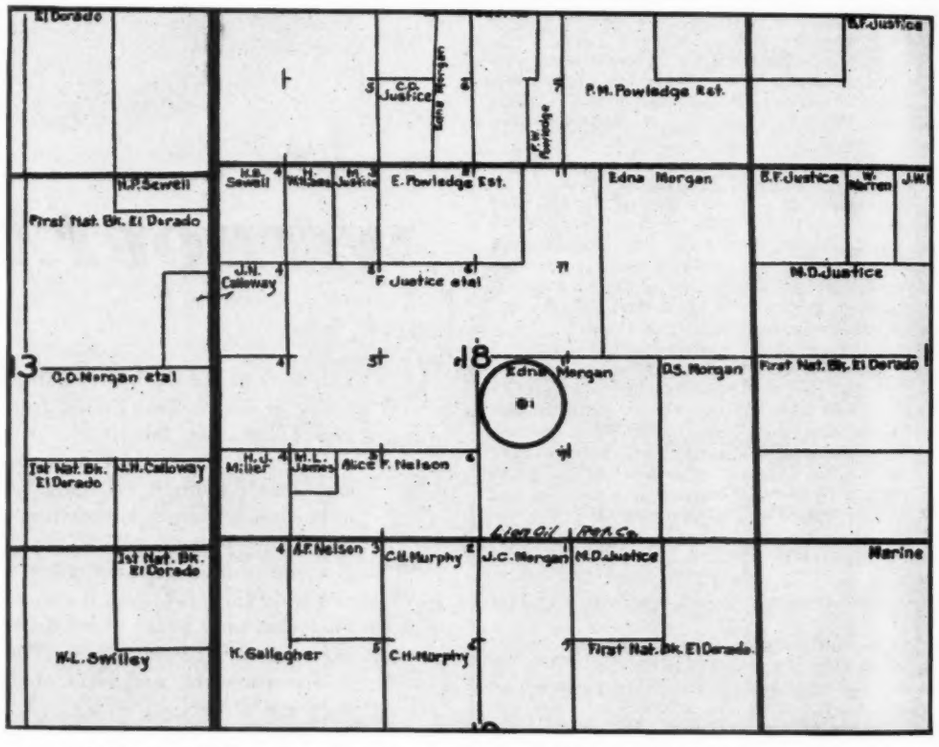
Texas side of Rodessa field—44,135 bbls. daily.

Rodessa

Nine new completions, 14 new locations, and a daily average production of 91,740 bbls. summarizes the activity in the Rodessa field last week. Of the new locations, eight were in Texas, four in Louisiana and two in Arkansas. The Arkansas Board of Conservation has granted a total of 12 permits for wells along the Louisiana border in the North Rodessa area.

Development work in the field must now be considered in five rather separate divisions: The east end development toward Ida, La.; the North Rodessa area, including new activity in Arkansas; the older producing area of the field north of Rodessa townsite, where considerable remedial work is now underway to reduce gas-oil ratios; the active southern portion of Cass County, Texas, where 45 wells are now drilling, and the southwest extension area in Marion County where a 12-mile area has been opened to exploration following the partial completion of new producers near Lodi and Jefferson.

The eastern edge of the field suffered a set back last week when Lyons & Neely No. 1 Noel, SE section 8-23-15, showed only salt water after acidizing with 2,000 gallons, total depth 6,086 feet. The same operators' No. 2 Noel, SE SE of same section, was shut down at 5,670 feet following this test.



Probable new field opener in Union County, Arkansas. Lion Oil Refining Co. No. 1 Morgan, section 18-18-17, indicated itself as large producer on drill stem test last week.—(Globe Map Co., Shreveport)

A new completion was made in the North Rodessa area, Standard Oil Co.-Gulf Refining Co. No. 2 J. R. Harden, NE NW NE section 16-23-16, flowing 390 bbls. naturally on initial test through 22/64-inch tubing choke, pressure 825 pounds, casing pressure 925 pounds, total depth 5,988 feet. The Standard-Gulf interests have two other wells in the completion stage at North Rodessa.

About 3 miles south of Rodessa townsite, and on the downthrow side of surface fault feature, R. W. Norton No. 1 Payne, SE SE section 27-23-16, proposed 10,000-foot test, is now coring below 8,575 feet. It is reported that this well cut back into the upthrow side of the fault considerably above this depth.

Marion County

The Lodi discovery well, 7 miles southwest of production in the Rodessa field, Arkansas-Louisiana Gas Co. No. 1 W. S. Ford, Charles Grayson Survey, again perforated 7-inch casing 6,095-6,122 feet with 50 shots, after which formation was acidized with 7,000 gallons of acid, followed by 300-bbl. oil load. After opening the well it flowed 452 bbls. in 10 hours through one-half inch tubing choke, tubing pressure 175 pounds, casing pressure 200 pounds. During the next 24 hours the well flowed 305 bbls. through various-sized chokes, with an estimated 500,000 feet of gas. Natural flow has declined to about 10 bbls. hourly.

The Texas Railway Commission granted permits to drill five wells on town lot sites in the city of Jefferson last week. No actual work on these locations has been started, however. Lease and royalty trading continues active in Marion County, and other wells are expected to start soon with oil as their objective.

The Jefferson discovery well, 7 miles further southwest of Lodi, Holcomb & Thomason, Flesh & Hootkins No. 1 Lizzie Henderson, on the R. Bennington Survey, flowed and swabbed oil during the early part of the week at the rate of about 15 to 20 bbls. hourly. A siphon, or jet valve, was set at 3,500 feet in the tubing string, and the well blown with air. It then produced about 7 to 10 bbls. hourly under 700 pounds pressure. When the air was cut off, the well would not flow. Operators here are considering the feasibility of either perforating higher in the saturated zone, or acidizing.

Other Rodessa Completions

Magnolia Petroleum No. 8 L. Haywood, P. Evans Survey, Cass County, Texas, flowed 526 bbls. in 24 hours on initial test through one-fourth inch tubing choke, total depth 5,920 feet.

United Gas No. 1-A Mitchell, SE corner section 17-23-16, flowed 24 bbls. hourly through three-eighths inch tubing choke, casing pressure 450 pounds, tubing pressure 280 pounds, total depth 5,910 feet.

United Gas No. 4 W. H. Mitchell, NW corner section 20-23-16, flowed 21 bbls. hourly through three-eighths inch tubing choke, tubing pressure 325 pounds, casing pressure 1,025 pounds, total depth 5,935 feet.

Magnolia Petroleum No. 3 Lewis and Wicks, Cass County School Land Survey, flowed 496 bbls. in 24 hours, one-fourth inch tubing choke, total depth 6,150 feet.

Magnolia Petroleum No. 6 Lewis and Wicks, A. Archer Survey, flowed 557 bbls. in 24 hours through one-fourth inch tubing choke, total depth 6,037 feet.

Phillips Petroleum No. 5 Farrier, William R. Myers Survey, flowed 462 bbls. in 24 hours through one-fourth inch tubing choke, 500 pounds casing pressure, total depth 6,150 feet.

Texas Co. No. 6 W. M. Hall, A. Archer Survey, flowed 528 bbls. in 24 hours through one-fourth inch tubing choke, total depth 6,065 feet.

Texas Co. No. 7 W. M. Hall, A. Archer Survey, flowed 67 bbls. hourly through one-half inch tubing choke, total depth 6,065 feet.

Bienville Parish

Seaboard Oil Co. No. 2 McGee, NE section 3-16-6, discoverer of two prolific gas-producing zones in the Bearcreek area, was completed in the Lower Glen Rose level, after perforating 7-inch casing at 6,665-95 feet with 50 shots, and gauging 67,000,000 feet of gas per day at 2,703 pounds rock pressure. The lower producing zone discovered was a sand member of the Travis Peak where 7-inch casing was perforated at 7,323-7,462 feet, with 50 shots. The well gauged 70,000,000 feet through three-eighths inch choke, 475 pounds testing tool pressure. The hole was plugged back to provide a test of the upper level, and completion was made there.

Lide & Greer No. 1 Smelley, SE SW NE section 13-16-5, proved the Travis Peak gas horizon by perforating 7-inch casing at 7,202-18 feet with 32 shots and gauging 25,000,000 feet of gas, total depth 7,693 feet. The same operators staked location for No. 1 W. J. Smelley, SE NW SW section 18-16-4w, which is presumed to be somewhat lower on structure, and possibly will carry oil saturation.

Bossier Parish

Louisiana Petroleum Corp. and others No. 1 Edward Estate, NW SW section 5-17-11, northern flank of the Sligo gas field, was completed. It was estimated good for 40,000,000 feet per day, total depth 5,187 feet.

In the oil producing area of the Sligo gas field, northwestern flank, United Gas No. 1-H A. C. Skannal, NE SE section 26-17-12, was acidized with 500 gallons and is now waiting for chemical reaction, after flowing about 200 bbls. daily during the testing period.

To the north of this location Triangle Drilling Co. No. 1-I Skannal, NE section 22-17-12, was acidized and began flowing 60 bbls. daily with 20,000,000 feet of gas on initial test. Testing continues here.

Caddo Parish

Bayou State No. 10-B Jolly, SE NE NE section 21-22-15, has been plugged and abandoned, total depth 1,017 feet.

Paul Cooper No. 1 Rodgers, NW SW SW section 11-20-15, pumped 12 bbls. oil and 75 bbls. salt water, total depth 2,215 feet.

Juan and others No. 1 Clara Hobbs, SW NW NW section 28-21-15, total depth 1,780 feet, has been plugged and abandoned.

B. F. Laney No. 1 Taylor, SW SE SW section 17-21-14, dry and abandoned, total depth 912 feet.

Gulf Refining Co.'s deep test in the Cross Lake area just west of Shreveport, No. 1 E. P. Hatcher, SW SE section 11-17-15, passed the 9,000-foot mark last week, and now explores below 9,060 feet.

Claiborne Parish

The first of four wells drilling to further prove the newly discovered Lisbon field reached the pay zone last week, and indicated itself as a good producer. Ray P. Oden and others No. 1 W. H. Patton, SW SE SE section 36-21-5w, drilled and

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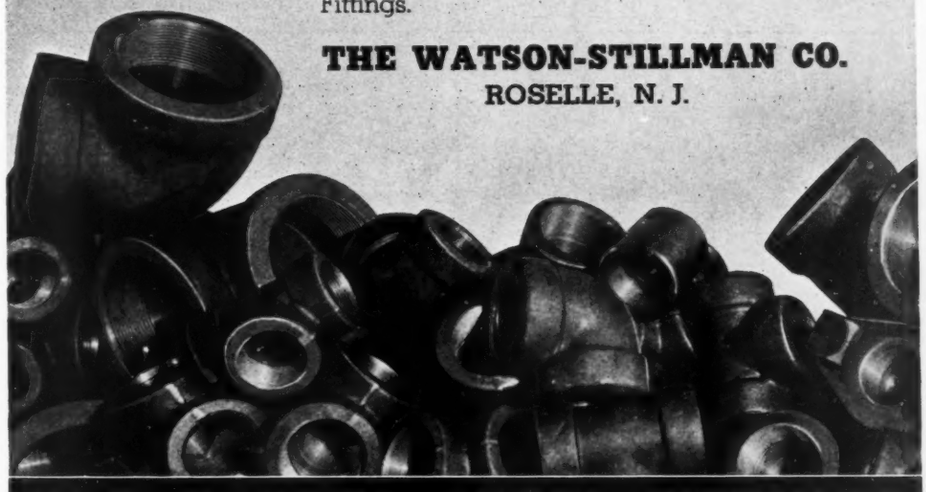

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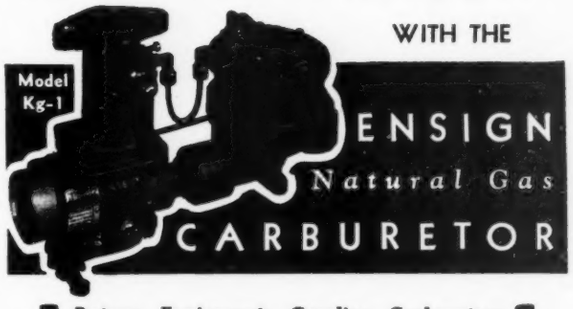

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cored porous and saturated Basal Glen Rose lime at 5,340-5,353 feet, and at total depth of 5,330 feet, drill stem test was made which showed six thribbles of oil in 12 minutes, with very little gas. Casing is being run preparatory to testing.

LaSalle Parish

Lee Oil Corp. No. 1 Tullos, SW NE NE section 26-10-1e, was completed in the Urania field as a 5-bbl. pumper, total depth 1,529 feet.

Lee Oil Corp. No. 2 Tullos, NE corner 26-10-1e, was found dry at total depth 1,524 feet, and has been abandoned.

Sabine Parish

M. A. Halsey No. 1 Belton, NE section 31-9-13, was completed as a 30-bbl. pumper after acidizing, total depth 1,709 feet, Converse field.

Richland Parish

Gulf Refining Co. No. 15 R. R. Rhymes and others, section 32-17-6e, proposed 10,000-foot test in the Richland gas field, is nearing that depth rapidly, as it now drills at 9,850 feet.

Webster Parish

United Gas No. 2 Davis, NW section 23-21-10, Cotton Valley field, total depth 8,555 feet, in new Lower Marine producing zone, made 26 bbls. of distillate and 328,000 feet of gas hourly through three-eighths inch tubing choke, rock pressure 3,500 pounds. Although this well is the lowest yet drilled on the deep structure at Cotton Valley, no water was in evidence.

Ohio Oil Co.'s No. 1 S. P. D. Coyle, section 23-21-10, set 9-inch casing at 5,541 feet for test of the apparently saturated Holloway sand. At total depth of 5,570 feet well tested 15 bbls. of distillate per hour with 8,000,000 feet of gas per day. Well is now waiting for orders, pending decision on whether to complete at present depth or deepen to the lower producing horizons.

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Designing with Armco Spiral Welded Pipe, for instance, you can specify the one right diameter and wall thickness for each part of your gas line—heavy walls for severe service and lighter walls for ordinary conditions.

This way you buy no "unneeded" metal. Every ounce serves a useful purpose . . . and does it efficiently, too, because Armco Spiral Welded Pipe is exceptionally strong, ductile and smooth inside. Besides, oil men tell us that field welding is easier and more uniform because Armco pipe itself is "a welded product."

To get a practical demonstration of designed pipe economy, just mail your specifications to Armco: for diameters 6 to 36 inches; for wall thicknesses 7/64 to 1/2-inch. The American Rolling Mill Company, Pipe Sales Division, 631 Curtis Street, Middletown, Ohio; 548 Mayo Building, Tulsa, Oklahoma.

ARMCO

Armco Spiral Welded Pipe

DESIGNED FOR YOUR SPECIFIC NEEDS

ARKANSAS

Dallas County

Walter Lowns No. 1 G. Atkinson, NE NW SE section 7-10-13, has been abandoned as dry, total depth 2,763 feet.

Miller County

It has been reliably reported that E. H. Moore, Inc., of Tulsa has purchased from C. V. Lenz of Texarkana his recently completed discovery well in the Texarkana pool, together with 2,800 acres surrounding the well, which is in section 24-15-26, about 8 miles due east of Texarkana. Consideration was reported as $1,100,000. Lenz retains about 3,200 acres in the immediate area.

Nevada County

One of the largest producers in the newly discovered Troy field was completed in the last week, Benedum-Trees, Inc., No. 3 C. C. Fincher, section 10-14-20, which pumped 518 bbls. in 20 hours on an initial test, from the Tokio sand 2,157-60 feet.

EAST TEXAS (Border Counties)

Bowie County

A new 6,000-foot test is scheduled to begin by March 20 on Thompson and Jaffe and others 7,500-acre block just south of Red River. Location is expected on the Rosamond tract, Milam Survey.

Panola County

United Gas Public Service Co. has completed the laying of 2-inch line from their Latex-Houston trunk gas line to the two gas producing wells of Glassell & Glassell south of Carthage. Magnolia Petroleum Co. has one producing well in this field, and is reported to be planning to drill an additional well soon.

Gulf Coast Fields

(Continued from Page 211)

feet east of No. 4. No. 6 Lafitte, in section 20 and 1,839 feet east of No. 4, is drilling below 8,619 feet.

In East Feliciana Parish, a wildcat test, Barnett Petroleum Co. No. 1 Tullis, was abandoned at 6,508 feet after failing to find any showing in the Cockfield sand, topped at 6,295 feet.

Texas Co. is believed to have marked up a record time in setting a long string of protection casing in No. 1 Bayou Sale in St. Mary Parish. Bottomed at 10,975 feet, a string of 7⅝-inch pipe was landed on bottom in the record time of 19 hours, and the cement was pumped down and set in 57 minutes and 30 seconds. The well is in section 40-17s-9e. It is expected that it will be carried below 11,000 feet.

Michigan Fields

(Continued from Page 187)

"The extent of the service of the Geological Survey is growing greater and greater every year," he said.

L. P. Barrett, a former member of the state staff, spoke for Dr. R. C. Allen, of Cleveland, state geologist immediately preceding Dr. Smith, who was unable to attend because of illness though he telegraphed "Congratulations and best wishes for the next hundred years." The speaker declared Dr. Lane's greatest contribution was a sound scientific basis, while Dr. Allen's administration started the later period of public service through friendly public contact.

"Not a breath of scandal has marred this record of the state Survey," he said.

The spirit of the past 25 years under Dr. Smith was expressed in his statement of his duty as outlined to him when he became assistant state geologist under Dr. Allen as follows: "Never pass the buck. No matter whether fool or Solomon, crackpot or intelligent, farmer or city dweller, seek the services of the Survey, answer the request satisfactorily and in such a courteous, friendly manner the one seeking information will come again."

The conservation department was represented at the dinner by Chairman William H. Loutit of Grand Haven, who paid tribute to Dr. Smith and his staff; Commissioners Harry Whitely of Dowagiac and M. J. Fox of Iron Mountain, who were introduced; Wayland Osgood, secretary and P. J. Hoffmaster, state director and toastmaster.

California Field Report

BIG WELL IN SANTA MARIA; DEEPER PAY IN ROSECRANS

By
L. P. STOCKMAN

LOS ANGELES, Calif., Mar. 22.—Discovery of a new deep zone in the Rosecrans field; the extension of the El Segundo and Mountain View fields, and preparations completed for a production test of a promising wildcat in the Newhall district, featured development work in California during the past week.

Barnsdall Oil Co. proved the existence of a new deep zone in the Rosecrans field of Los Angeles Basin by completing No. 10 O'Dea, flowing 640 bbls. of clean 35.8 gravity oil and 3,400,000 feet of natural gas per day from 7,530 feet. This former upper zone producer was carried to 7,664 feet but was plugged back to the completion depth and finished with a 4¾-inch liner, carrying 225 feet of perforated. No. 10 O'Dea was finished approximately 1,800 feet below the Zinns zone, and is believed to be the first commercial producer completed in the Miocene. Barnsdall Oil Co. and Union Oil Co. control the cream of the potentially productive acreage in the Rosecrans field, but there is some good looking acreage around the edge of the structure and it is expected that several new wells will be drilled and a few others deepened in the near future. Neither Barnsdall or Union has made any additional plans for development, but may be obliged to undertake offset drilling, as Exeter Oil Co. and other operators holding adjacent leases contemplate early drilling.

TANKER SHIPMENTS FROM LOS ANGELES TO DOMESTIC AND FOREIGN PORTS

	Total this week	Daily average	Total last week	Daily average	This year to date	Same time last year
Intercoastal-domestic:						
Diesel and gas oil	.....	.....	.....	.....	176,726	77,391
Gasoline	.....	.....	.....	.....	286,012	1,142,622
Kerosene	.....	.....	.....	.....	.....	385,956
Foreign exports:						
Crude oil	147,262	21,037	390,670	55,810	2,069,847	1,636,860
Fuel oil	228,288	32,613	162,600	23,229	2,476,364	1,959,088
Diesel and gas oil	115,081	16,440	53,605	7,658	1,404,411	701,323
Gasoline	.....	.....	196,703	28,100	1,114,551	1,067,561
Kerosene	.....	.....	.....	.....	588,107	77,452
Other unfinished oil	.....	.....	.....	.....	156,531	6,439
Coastwise-domestic:						
Crude oil	25,304	3,615	35,609	5,087	1,103,317	1,110,630
Fuel oil	448,752	64,107	343,083	49,012	2,852,681	1,367,258
Diesel and gas oil	2,554	365	109,958	15,708	505,998	369,417
Gasoline	150,671	21,524	200,070	28,581	2,138,951	2,512,209
Kerosene	2,981	426	.....	.....	28,295	62,895

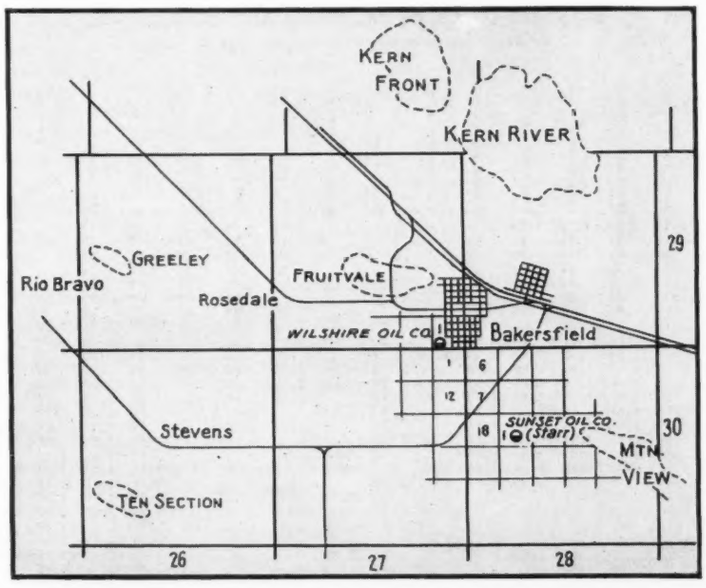
TANKER SHIPMENTS FROM SAN FRANCISCO TO DOMESTIC AND FOREIGN PORTS

Intercoastal-domestic:						
Diesel and gas oil	77,037	11,005	.....	.....	152,932	.....
Gasoline	.....	.....	.....	.....	25,778	.....
Lubricants	.....	.....	.....	.....	.....	1,779
Foreign exports:						
Crude oil	24,871	3,553	.....	.....	681,168	482,936
Fuel oil	.....	.....	66,769	9,538	254,876	660,402
Diesel and gas oil	161,072	23,010	81,242	11,606	619,304	100,856
Gasoline	225,476	32,211	97,601	13,943	1,248,634	717,192
Kerosene	28,064	4,009	.....	.....	165,359	163,009
Lubricants	16,614	2,373	.....	.....	140,991	43,008
Coastwise-domestic:						
Fuel oil	173,491	24,784	155,552	22,222	1,350,278	1,447,240
Diesel and gas oil	.....	.....	.....	.....	108,023	76,898
Gasoline	121,616	17,374	48,506	6,929	928,143	819,175
Kerosene	.....	.....	.....	.....	21,509	24,588

El Segundo

Union Oil Co. and Texas Co. appear to have extended the productive limits of the El Segundo field of Los Angeles Basin if the showings of their respective outposts is any criterion. Union No. 1 El Segundo, the most southeasterly well in the field, blew in prematurely, flowing 1,200 bbls. of clean 28.7 gravity oil during a water shutoff test on the 7⅝-inch water string cemented at 7,646 feet. The well came in after the cement had been drilled out 6 feet below the shoe and the company allowed it to produce for 12 hours before killing it, preparatory to drilling ahead and completing. This well, which picked up the top of the Nodular shale at 7,630 feet and top of the Conglomerate at 7,658 feet, has cored the best looking oil sand found in the El Segundo field, but has not yet found Schist, in which all other wells have been bottomed. Republic Petroleum No. 3 El Segundo proved a dismal failure on a production test from 7,400 feet, as its maximum flow by heads has not exceeded 240 bbls. of 29.1 gravity oil per day. In addition to the oil produced, the well made 350,000 feet of gas, which has a gasoline content of 2½ gallons to each 1,000 feet of gas treated. No. 3 El Segundo has a 7-inch water string cemented at 7,300 feet and the hole was finished with a 5-inch liner carrying 110 feet of perforated. Top of the Nodular was logged at 7,149 feet, top of the Conglomerate at 7,327 feet and top of Schist at 7,367 feet.

The Texas Co. No. 1 Security, the most westerly well in the El Segundo field and bottomed at 7,253 feet, was given a formation test and it showed up unusually good. Gas rose to the surface in less than 10 minutes and the following fluid was all oil. Based on this short flow, the well looks good for about 500 bbls. of oil and a little better than 1,000,000 feet of gas. In the eastern end of the field, Texas Co. No. 2-1 Johnson has been plugged back due to a gray water sand found at 7,751 feet, which is about 5 feet above the bottom of the hole. Richfield Oil Co. No. 1 El Segundo, the field's largest producer, is still flowing 1,320 bbls. of exceptionally clean 27.4 gravity oil per day. Caminol Co. No. 2 El Segundo, bottomed at 7,301 feet and finished with a 5-inch liner carrying 100 feet of perforated, looks like a dud as the hole was bailed absolutely dry. No. 1 El Segundo of the same company does not look much better although small production may possibly be developed.



Wilshire Oil Co. and Sunset Oil Co. have made locations for interesting wildcat tests between Mountain View and Fruitvale fields in Kern County

Mohawk Oil Co., which focused the attention of operators on the Arvin section of the Mountain View field of Kern County several months ago by completing an outpost alternately pumping and flowing by stages at the rate of about 200 bbls. per day, removed all doubt as to the importance of this find a few days ago by completing No. 3 Arvin flowing 1,070 bbls. of 25.8 gravity oil and 4,000,000 feet of gas per day from 5,358 feet. This outpost is located a little less than a mile southeast of the Mountain View field and appears to have either extended the limits of this field or proved up the existence of a new accumulation. Correlation work tends to indicate that the Mohawk's new producer is an outpost in the Mountain View field, however, rather than a discovery well in a new field. In addition to completing No. 3 Arvin, Mohawk successfully recompleted No. 2 Clendennen in the older section of the field and this well was returned to production pumping 246 bbls. of 26.5 gravity oil per day from 5,950 feet. Liko Petroleum Co. picked up the top of the Chanac at 4,961 feet in its well No. 1 in section 19-30-29, and the bit is at present rotating ahead in shale and oil sand at 5,000 feet.

Tejon Ranch

Reserve Oil & Gas Co. succeeded in developing a small, but short, flow in its Tejon Ranch wildcat early in the week, but found it necessary to reenter the hole after the well sanded up. The liner was found to be in bad shape, and will be replaced with a new string. The well in question is No. 33-2 in section 33-11-19, and while it did not have sufficient gas to result in a natural flow, it responded after natural gas from No. 33-3 was injected. It flowed by heads at the rate of 150 bbls. of 24.5 gravity oil per day for several hours. This tends to indicate the presence of a possible accumulation of commercial production but the showing of No. 33-2 and No. 33-3 appears to indicate that the main body of sand is somewhat removed from the scene of recent prospecting.

Santa Maria

In the Santa Maria Valley field of Santa Barbara County, Union Oil Co. completed No. 2 Adams, flowing 4,290 bbls. of exceptionally clean 15.3 gravity oil per day from 3,791 feet. The well would probably show a daily potential of approximately 10,000 bbls. if the company enlarged the flow bean. This is the largest well completed in the Santa Maria Valley field since its discovery by Union Oil Co. more than a year ago. Union is rushing its new pipe line to completion and it should be in operation on or before May 1. The company plans to drill two wells on the Mahoney and Enos leases and both

should be spudded within a fortnight. Union Oil Co., incidentally, has already sold three cargoes of Santa Maria Valley crude oil for delivery to Belgium next summer and this may be the start of a permanent market as this oil is one of the best asphaltic crudes available in California. R. R. Bush Oil Co. is reaming No. 1 Hopkins and will land a string of 8⅝-inch at approximately 2,000 feet, preliminary to an early production test. This well was bottomed at 4,510 feet and has about 1,500 feet of good looking formation from which to produce. The Franciscan, which is the basement complex, has not been reached in this well, so there may be another substantial thickness of potentially productive formation immediately below the present bottom.

Wilmington

In the Wilmington field of Los Angeles Basin Pacific Western Oil Co. finished No. 1 Murphy, flowing 551 bbls. of relatively clean 17.8 gravity oil daily from 3,585 feet after finishing the hole with an 8⅝-inch liner carrying perforations at 3,200-3,585 feet and which was cemented through perforations at 2,802 feet. Bankline Oil Co. No. 1 Tutor proved good for 262 bbls. of 17.8 gravity oil daily from 3,315 feet, but the flow may show a substantial increase after the well has been on production for several more days. General Petroleum Corp., discoverer of the Wilmington field, completed No. 1 Eubank and No. 1 Flint, but no accurate gauge has yet been made. The company has adopted the policy of completing new wells as small producers and later increasing the size of the bean as this method in the Wilmington field has been found efficacious in eliminating sand trouble. F. C. Hall, Inc., has completed No. 1 Wilmington and this new well was brought in flowing 480 bbls. of clean 18.9 gravity oil daily from 3,611 feet. Union Pacific Railroad has started three wells and has six derricks erected in addition to staking four new locations.

Los Angeles Basin

In the Flood Control district between Long Beach and Dominguez fields, Hildon Oil Co. will resume drilling No. 1, which, on a pumping test several days ago, indicated that it should be good for about 100 bbls. per day in its present condition. The company's officials are of the opinion that with the addition of more hole, production should be substantially increased. This outpost on the south side of the Cherry Hill fault is approximately 500 feet higher structurally than the Shell's test in that area, and shows dips of approximately 20 degrees. Present bottom is at 5,684 feet, and a string of 5¾-inch has been cemented at 5,672 feet. In the West Coyote field Standard Oil Co. completed No. 62 Emery, pumping 54 bbls. of 26.2 gravity oil and 193 bbls. of water per day from 4,200 feet. In the Montebello extension Universal Consolidated has recompleted No. 1-J Nutt flowing 151 bbls. of 31.8 gravity oil cutting 22 per cent. It was returned to production after the hole had been plugged back to 5,860 feet, following the failure to develop sustained production in the deep zone.

Gas Fields

In the Rio Vista gas field of Solano County Amerada Petroleum Corp. made a formation test on No. 1 Mayhood, and with the tester open seven minutes between 4,310 and 4,532 feet, flowed at the rate of 32,000,000 feet of gas per day. Upon conclusion of the test a string of 7-inch was cemented at 4,350 feet. The crew has been temporarily moved to No. 2 Drouin, and rotary drilling equipment is being rigged. In the Buena Vista Lake gas field of Kern County Ohio Oil Co. No. 4-A on the Kern County Land Co. lease in section 32-31-26, is drilling below 5,100 feet. No drilling is being done in any of the other gas fields.

Coastal Area

Barnsdall Oil Co. has completed another excellent producer in the Gato Ridge field of Santa Barbara County, and has already spudded No. 6 in section 9-8-32. As these wells are finished at a shallow depth, No. 6 may be on production within 15 days. The company's new producer is No. 9 Tognazzini which was brought in pumping 1,105 bbls. of exceptionally clean 14.3 gravity oil per day from 2,465 feet. Petrol Corp. will soon begin drilling operations on No. 3-A Tognazzini in section 9-8-32. In addition to this work the company is making preparations to start work on No. 4-A in the same area. Field Gasoline Corp., which is drilling a new well on the Gato Ridge anticline on property subleased from Continental Oil Co. is rotating ahead at 3,100 feet and using oil instead of the usual drilling fluid.

In the Capitan field of Santa Barbara County Shell Oil Co. completed No. 1-23 Covarrubias, flowing 344 bbls. of 2.13 gravity oil and 22,000 feet of gas per day from 1,305 feet. The company spudded in No. 1-20 Covarrubias and began erecting rigs for Nos. 1-21 and 1-22 and staked location for No. 1-24. In the Elwood field Signal Oil Co. completed No. 98-9 Tideland, it was good for about 100 bbls. of net oil per day, as the output of 560 bbls., showed an excessive water cut. It was bottomed at 3,194 feet, but was brought in barefoot, no pipe being landed below the water string landed at 3,679 feet. In the Ventura Avenue field Tide Water Associated recompleted No. 28 Lloyd after redrilling and deepening the hole to 6,850 feet, from which depth the well is doing 31 bbls. per day on a compressor.

San Joaquin Basin

In the North Belridge field of Kern County Belridge Oil Co. completed No. 14-35 in section 35-27-20, flowing 525 bbls. of clean 31.3 gravity oil per day from the Wagonwheel zone at 8,400 feet. The hole was finished with a 7-inch water string landed at 8,035 feet and a 4¾-inch liner. In the Midway-Sunset field Iroquois Oil Co. completed No. 1 Sunset in section 7-11-23, pumping 148 bbls. of 15.1 gravity oil per day from 1,729 feet. The hole was finished with a 10¾-inch water string landed at 1,542 feet and an 8⅝-inch liner carrying 167 feet of perforated. Chanslor Canfield Midway Oil Co. No. 26 in section 21-32-23, was brought in pumping 700 bbls. of water upon completion at 2,332 feet but is now pumping about 50 bbls. of oil along with the water.

In the Round Mountain field of Kern County Cal-Western Oil Co. completed No. 2 Smoot pumping 297 bbls. of clean 14.9 gravity oil per day from 2,084 feet, after the hole had been finished with an 8⅝-inch water string cemented at 2,035 feet, and a 6⅝-inch liner carrying 50 feet of perforated. Honolulu Oil Corp. No. 65 in section 18-28-29, should be ready for a test within another 10 days. New rigs have been erected for Nos. 24 and 25, and both are scheduled for early work. In the Mount Poso field, Ring Oil Co. completed No. 3 Knapp in section 28-26-28, but it was good for only 101 bbls. of 15.2 gravity oil per day from 1,480 feet. Several wells are being started in the Mount Poso field and two more are expected to be located within a few days. New wells getting under way in this area include Ekoh Oil Co. No. 2 Vedder in section 28-26-28; Hub Oil Co. No. 1 McNeil; Recovery Oil Co. No. 4 and Ring Oil Co. No. 29-2. In the Fruitvale field of Kern County, H. M. Magee has completed his No. 1 Douglas in section 23-39-27 but it was only good for 100 bbls. of net oil per day from 3,244 feet. Production of this well is showing an excessively high water cut and this may result in the doing of some additional work.

Wildcats

Two wildcats are being started in the Union Avenue district of Kern County, a few miles south of Bakersfield, and both should be spudded in shortly. In the Wasco area Continental Oil Co. is still held up by mechanical trouble in No. 1-A Kern County Land at 9,545 feet, but measures are being undertaken to mill up the lost bailer as this test showed some promise just before the mishap occurred. In the Rio Bravo district Tide Water Oil Co. has reached a depth of 8,773 feet and Union Oil Co. has completed plans to begin drilling operations on No. 1-34 on the Kern County Land Co. property in section 34-28-25. In the Rosedale area, Continental Oil Co. has logged several good showings in a wildcat located in section 12-29-26, but has decided to drill ahead. Union Oil Co. has cored the top of the Etechegoin in a wildcat in the San Emidio district of Kern County at 3,807 feet and is at present rotating ahead in brown shale a little below 4,400 feet.

STANDARD OIL CO. OF CALIFORNIA AND UNION OIL CO.

Crude oil prices at the well effective June 22, 1936

Gravity—	Signal Hill (Long Beach)	Seal Beach	Alamitos Heights	Huntington Beach	Inglewood	Playa del Rey	Olinda-Brea Canyon	Athens-Rosecrans	Dominguez	Elwood Terrace	Torrance	Richfield	Whittier E. Coyote (La Habra)	Montebello	W. Coyote Hills	Santa Fe Springs	Mountain View	Elk Hills Buena Vista Hills Midway-Sunset Lakeview Area	Lost Hills	Coalinga	Wheeler Ridge	Kettleman Hills	Santa Paula*	Orcutt*
14-14.9	$.80	$.79	$.74	$.78	$.79	$.80	$.76	....	....	....	$.80	$.76	$.76	$.77	$.78	....	....	.70	$.70	$.70	....	....	$.70	....
15-15.9	.80	.79	.74	.78	.79	.80	.76	....	....	....	.80	.76	.76	.77	.78	....	....	.70	.70	.70	....	....	.70	....
16-16.9	.80	.79	.74	.78	.79	.80	.76	....	....	....	.80	.76	.76	.77	.78	....	....	.70	.70	.70	....	....	.70	$.70
17-17.9	.80	.79	.74	.78	.81	.80	.76	....	....	....	.80	.76	.76	.77	.78	....	....	.70	.70	.70	....	....	.71	.70
18-18.9	.80	.79	.74	.78	.84	.80	.78	....	....	....	.82	.76	.76	.77	.78	....	....	.70	.70	.70	....	....	.73	.72
19-19.9	.82	.79	.74	.82	.87	.84	.81	....	....	....	.85	.76	.78	.77	.78	....	$.70	.74	.74	.71	$.70	....	.75	.74
20-20.9	.85	.79	.74	.85	.90	.88	.84	....	....	....	.88	.78	.92	.77	.80	....	.70	.78	.78	.72	.70	....	.77	.77
21-21.9	.88	.79	.74	.89	.93	.93	.88	....	....	....	.91	.80	.86	.77	.84	$.78	.73	.82	.82	.74	.70	....	.79	.80
22-22.9	.92	.82	.74	.92	.96	.98	.92	....	....	....	.93	.84	.89	.79	.88	.78	.77	.87	.86	.78	.72	....	.82	.83
23-23.9	.95	.86	.77	.96	.99	1.02	.96	$.84	$.79	....	.96	.88	.93	.82	.92	.78	.80	.92	.90	.82	.76	....	.85	.86
24-24.9	.99	.91	.80	1.00	1.02	1.06	.99	.88	.81	....	.99	.91	.96	.85	.96	.82	.84	.97	.94	.86	.79	....	.87	.88
25-25.9	1.03	.95	.82	1.03	1.05	1.11	1.03	.93	.83	....	1.02	.95	....	.89	.99	.86	.88	1.01	.98	.90	.83	....	.90	.91
26-26.9	1.06	1.00	.85	1.07	1.09	1.16	1.06	.98	.86	....	1.05	.98	....	.92	1.03	.90	.91	1.06	1.02	....	....	....	.92	.93
27-27.9	1.10	1.05	.88	1.11	1.12	....	1.10	1.03	.88	....	....	1.02	....	.96	1.06	.95	.95	1.10	1.06	....	....	....	.95	....
28-28.9	1.14	1.10	.90	1.14	1.15	....	1.14	1.07	.90	....	....	1.06	....	.99	1.10	.99	.99	1.15	1.10	....	....	....	.97	....
29-29.9	1.17	1.15	.93	1.18	1.18	F.O.B.	1.17	1.12	.93	....	....	1.09	....	1.03	1.14	1.03	1.02	1.20	1.14	....	....	....	.99	....
30-30.9	1.21	1.19	.95	1.22	1.21	our	1.21	1.17	.95	F.O.B.	....	....	....	1.07	1.17	1.08	1.06	1.25	1.18	....	....	....	1.01	....
31-31.9	....	....	....	....	1.24	Pipe	1.24	1.22	.97	Ship	....	....	....	1.11	1.21	1.13	1.09	1.29	....	....	....	....	....	....
32-32.9	....	....	....	....	1.27	Line	1.27	1.27	1.00	....	....	....	....	1.14	1.25	1.16	1.13	1.34	....	....	....	....	....	....
33-33.9	....	....	....	....	....	....	....	1.32	....	$1.28	....	....	....	1.18	1.28	1.20	1.17	1.38	....	....	....	$1.19	....	....
34-34.9	....	....	....	....	....	....	....	1.37	....	1.32	....	....	....	1.22	1.32	1.25	1.20	....	....	....	....	1.23	....	....
35-35.9	....	....	....	....	....	....	....	1.42	....	1.35	....	....	....	1.25	....	1.29	....	....	....	....	....	1.27	....	....
36-36.9	....	....	....	....	....	....	....	1.46	....	1.39	....	....	....	1.29	....	1.33	....	....	....	....	....	1.31	....	....
37-37.9	....	....	....	....	....	....	....	1.51	....	1.43	....	....	....	1.32	....	1.37	....	....	....	....	....	1.35	....	....
38-38.9	....	....	....	....	....	....	....	1.56	....	....	....	....	....	1.36	....	1.42	....	....	....	....	....	1.39	....	....
39-39.9	....	....	....	....	....	....	....	1.61	....	....	....	....	....	1.40	....	....	....	....	....	....	....	1.43	....	....
40-40.9	....	....	....	....	....	....	....	1.66	....	....	....	....	....	1.43	....	....	....	....	....	....	....	....	....	....

Newhall, McKittrick, Kern River, Kern Front and Round Mountain, 70 cents for all grades. *Posted by Union Oil Co. Same company's Brea Canyon schedule stops at $1.14 for 28 degrees and over, and Belridge and Lost Hills schedule stops at $1.32 for 37 degrees and over.

Central West

Operations in Central Ohio, Kentucky, Illinois, Indiana

By GEORGE A. WHITNEY

FINDLAY, Ohio, Mar. 22.—A great deal of interest has been created by the announcement that N. L. Stevens, who recently drilled four tests for oil in Fulton County, is spudding in a test in section 36-5n-7e, Harrison Township, Henry County, northwestern Ohio. This test is scheduled for the Trenton sand and the operators are planning to drill many more tests if the first well is successful. The same operators' second test on the Enos Roth farm, in section 13, German Township, Fulton County, is still shut down after making a good show of oil and gas. As a result of this new test in Henry County, local operators are securing protection acreage as rapidly as possible and there will undoubtedly be a lease play in that part of the state, comparable to the one of a few months ago near Wauseon, in Fulton County.

KENTUCKY FIELD

Total runs made from wells served by the Illinois Pipe Line Co. in western Kentucky during the month of February averaged 3,893 bbls. per day, a gain of 989 bbls. per day over the previous month. Many new tests are being planned in Kentucky and local operators are of the opinion that there will be a great increase in activity in that area during the next few months. Operators from other fields are entering Kentucky and there will undoubtedly be considerable exploration of the lower horizons in the western coal basin as well as in the shallower formations in the eastern sections.

In McLean County, near Calhoun, the Ohio Oil Co. No. 12, G. B. McManama, Account No. 2, made 5 bbls. a day after a shot and has been connected to pipe line. In the same county, about 2 miles east of Livermore, Clark & Snyder, completed a second test on the Humpreys tract, which made a natural flow of 15 bbls. in 24 hours. It has been connected to pipe line.

In Ohio County, on a point between the Green and Rough Rivers, the Rough River Corp.'s test on the Jim Knoll farm has been abandoned as a failure.

CENTRAL OHIO FIELD

Seventeen completed operations were reported in the Central Ohio field during the past week and many new locations are being staked. A review of completions shows 11 gas wells, two dry holes and four oil wells with a total new production of 105 bbls.

The largest oil well of the week was Kachelmacher Estate No. 18 Hemlock Coal Co., in section 30, Monroe Township, Perry County. This well made a good showing of oil naturally in the Clinton sand at 3,590-3,625 feet, and after a shot of 90 quarts produced 60 bbls. the first 24 hours. In section 25, Coal Township, same operators are drilling below 2,600 feet in No. 19, on the same property. In section 36, same township, Preston Oil Co. made a location for No. 147 Sunday Creek Coal Co. property. In the same section, Bell & Co. No. 3 S. Seidenfield, was drilled through the Clinton sand at 3,681-3,716 feet, with a break in the sand from 3,701-06 feet, and is being cleaned out after a shot.

The Bowler Oil & Gas Corp. is spudding in the second test on the J. & D. Barnhart farm in section 24, Benton Township, Hocking County.

Pure Oil Co. on the Ernest Epply lease in section 17, Brush Creek Township, Muskingum County, drilled through the Clinton sand at 4,060-4,106 feet to a total depth of 4,103 feet where it produced 3,465,000 feet of gas naturally, with a rock pressure of 1,000 pounds.

City Natural Gas Works No. 4 Matilda Bowers, in section 33, Berne Township, Fairfield County, was drilled through Clinton sand at 2,092-2,117 feet to a total depth of 2,122 feet and was completed as a 115,000-foot gas well with a rock pressure of 38 pounds, and in the same section the City Natural Gas Works is rigged up for No. 7 John Stucky.

Petri & Newman are rigged up on the Caughlia Bunt farm, in section 35, Windsor Township, Lawrence County.

In Vinton County, Fraction 12, Knox Township, Powers No. 11 Cameron Clark, was completed below the Berea sand at 1,163-73 feet with a show of oil and after a shot of 50 pounds of gelatine bailed 5 bbls. in 24 hours.

In Cuyahoga County, Lot 306, Newburg Township, National Smelting Co. No. 1 J. H. Breck, has a settled production of 16 bbls. a day.

Cashdollar & Co.'s test on the J. T. Henderson property, in section 13, Palmyra Township, Portage County, was abandoned. Sands at 4,695-4,744 feet and 4,746-66 feet were without a showing of oil or gas.

In Huron County, section 2, Bronson Township, Williams & Co. No. 1 L. and F. Chapin, made a total of 5,000 feet of gas naturally from shale at 250 and 295 feet and will be shot. In section 3, Hartland Township, Leathers & Co. are spudding in a test on the D. W. Reynolds farm.

In Lorain County, section 4, Lagrange Township, C. J. Daugherty's test on the E. Nichols lease, was completed as a 132,000-foot gas well with a rock pressure of 800 pounds. This gasser was completed in the Clinton sand at 2,289-95 feet.

Ohio Fuel Gas Co. No. 1 Samuel Speicher, in section 23, Paint Township, Wayne County, which made 30,000 feet of gas in the Red sand at 4,158-86 feet, has been plugged and abandoned.

Obermiller Brothers are rigged up on the Fred Kleinknecht farm, in section 8, Liverpool Township, Medina County. In section 37, Medina Township, Ohio Fuel Gas Co. is rigged up on the E. W. Nichols property and the same company's No. 1 Charles Ganyard, in Lot 47, Granger Township, has been shut down at 3,325 feet, awaiting pipe.

Jims Run Oil & Gas Co. No. 1 Susan Haught, in section 5, Benton Township, Monroe County, was drilled to a total depth of 1,636 feet and was completed as a 199,200-foot gas well. Gas was found in the third Salt sand at 1,360 feet, and in the Injun sand at 1,600-05 feet and a show of oil was made at 1,630 feet. The same company has staked a location for No. 3 Enos Haught, same section. In section 10, Bethel Township, Johnson Oil Co. is deepening No. 1 Clarence Busche (C. Unger), from the Cow Run sand at 895 feet. A. Anderson & Co. are deepening another old well from 1,489 feet, on the William Mahoney farm, in section 4, Center Township.

Home Utility Co. No. 8 J. R. Grimes, in section 32, Wayne Township, Belmont County, gauged 74,000 feet of gas in the Salt sand at 1,206-11 feet and will be drilled deeper. In section 35, Smith Township, A. J. West & Co. No. 1 Susan Crossley, which has been shut down at 1,500 feet, has resumed drilling. In section 32, Wayne Township, Barnesville Development Co. is drilling below 900 feet in a test on the Howard Brown lease.

In Morgan County, section 1, Homer Township, Choguill & Co. No. 24 Onie Linscott, is drilling below 800 feet after making 300,000 feet of gas with the hole full of water, in the sand at 510-45 feet. In section 20, York Township, Hopewell Gas & Fuel Co. is shut down on the Everett Fisher lease to secure additional acreage.

B. Johnson No. 5 Anna L. Snow, in Fraction 34, Rome Township, Athens County, was completed as a commercial gas well at 915 feet. This well made 100,000 feet of gas in the Maxsburg 800-foot sand at 867-906 feet, and 798,000 feet in the Maxon sand at 912-15 feet for a total volume of 898,000 feet of gas with a rock pressure of 400 pounds. In section 23, Lodi Township, Ohio Fuel Oil Co.'s test on the Arthur Brooks farm, was completed as a small gas well in the second Berea sand at 1,677-87 feet.

Ferguson, McCullough & Co. are rigged up for No. 3 on the Henry Gillespie farm in section 15, Jefferson Township, Guernsey County.

In Washington County, section 13, Warren Township, McVey Oil & Gas Co. No. 1 John Arnold, which made a good show of gas and was to be shot, is being drilled deeper after the hole filled with water. This test is drilling below 1,700 feet after making a show of gas in the Injun sand at 1,537-65 feet. In section 28, Grandview Township, C. D. Uhl, has staked a location for No. 12 on his own property. In section 28, Newport Township, W. F. Purgess & Co. is spudding in the No. 6 on the W. H. Todd property.

Ohio Fuel Gas Co. completed a large commercial gas well on the Birdie Lesher farm in section 14, Rutland Township, Meigs County. This test was completed in the Keener sand at 761-69 feet. In section 25, Lebanon Township, Ohio Fuel Gas Co. No. 1 Robert Cozart was completed in the first Berea sand at 2,086-91 feet as a commercial gas well and in section 35, same township, Ohio Fuel Gas Co. completed a commercial gas well on the Daniel Sayre farm, in the same sand at approximately the same depth.

CALIFORNIA OIL FIELD DEVELOPMENT

(Figures of production and stocks are in barrels of 42 gallons)

	Total production	Daily average		
	January,	January,	December,	January,
Group No. 1—	January	1937	1936	1936
Belridge—North	468,737	15,121	14,152	9,578
Belridge—South	58,702	1,894	1,850	2,304
Coalinga	501,679	16,183	15,442	21,326
Edison	154,793	4,993	5,344	5,561
Elk Hills	263,062	8,486	8,408	9,708
Fruitvale	263,024	8,485	8,654	7,470
Greeley	13,896	448	128	.....
Kern River	466,736	15,056	14,692	16,457
Kettleman Middle dome	6,385	206	235	416
Kettleman North dome	2,401,573	77,470	77,660	96,780
Lost Hills	118,938	3,837	3,705	4,667
McKittrick	49,154	1,586	1,749	4,194
Midway-Sunset	2,038,611	65,762	66,458	62,095
Mountain View	665,957	21,482	20,762	36,018
Mount Poso	557,390	17,980	17,907	22,537
Round Mountain	366,260	11,815	11,472	10,210
Ten Section	31,467	1,015	1,034	.....
Wheeler Ridge	10,089	325	332	409
Group No. 2—				
Capitan	56,909	1,836	1,859	1,849
Elwood	300,839	9,705	10,479	16,109
Rincon	65,277	2,105	2,216	2,071
San Miguelito	68,471	2,209	2,145	1,650
Santa Barbara	23,312	752	764	2,170
Santa Maria	147,749	4,766	5,328	4,027
Summerland	1,144	37	35	36
Ventura Avenue	1,050,427	33,885	34,427	40,520
Ventura-Newhall	153,619	4,955	5,030	4,283
Watsonville	1,860	60	60	60
Group No. 3—				
Brea-Olinda	253,304	8,171	8,065	9,984
Coyote—East	94,600	3,051	2,834	2,771
Coyote—West	236,867	7,641	8,035	10,426
Dominguez	757,519	24,436	24,896	30,610
El Segundo	66,025	2,130	2,100	.....
Huntington Beach	1,082,930	34,933	35,331	41,239
Inglewood	397,627	12,827	13,132	15,433
Lawndale	2,601	84	91	270
Long Beach	1,926,323	62,139	63,596	77,838
Los Angeles-Salt Lake	25,052	808	798	747
Montebello	277,900	8,964	8,855	7,977
Playa Del Rey	319,553	10,308	10,382	16,164
Potrero	8,568	276	297	332
Richfield	227,620	7,343	7,210	8,238
Rosecrans	69,864	2,254	2,202	2,737
Santa Fe Springs	1,351,217	43,588	44,386	53,740
Seal Beach	294,592	9,503	8,688	11,187
Torrance	252,394	8,142	9,701	6,864
Whittier	28,128	907	909	1,035
Wilmington*	52,906	1,707	.....	.....
Total January	18,031,650	581,666	583,835	680,097
Total December	18,098,891	583,835	.....	.....
Decrease	67,241	2,169	.....	.....

*Situated 20 miles south of metropolitan Los Angeles and directly southwest of the city of Long Beach.

Canadian Fields

Completions and Operations in Northwest and in Ontario

By VICTOR LAURISTON

CHATHAM, Ontario, Mar. 20.—On the Majestic structure, west of Taber in southern Alberta, Plains Petroleum No. 1 Engelson, LSD 14, section 29-19-7w5, has been finished as a producer from the Ellis sand at 3,212 feet. The strike opens a new field in southern Alberta, and is likely to be followed by extensive development in that area.

The test got the top of the Ellis at about 3,199 feet, and drilled 13 feet into the sand. Three 500-bbl. tanks were connected, and a definite test started. On the basis of early production, officials rate the well at 200 to 250 bbls. a day, the well blowing by heads at less than 1-minute intervals. It will be swabbed, and, if necessary tubed to get a steady flow.

A test of the crude at the Huff refinery at Lethbridge showed 25.6 gravity, with a paraffin base. Analysis showed: Sulfur, .08; gasoline, 22.00; kerosene or distillate, 18.00; diesel oil, 16.00; fuel or road oil, 41.00; loss, 1.00; moisture, 2.00.

Plains Petroleum Corp. holds oil rights on some 39 quarter sections on the Majestic structure, with holdings in Townships 9 and 10, Ranges 16 and 17w4, acreage being checkerboarded with that retained by the Taber Oil Syndicate. Acreage is subject to 12½ per cent royalty to Majestic Mines Co.

Filings at the Lethbridge land office, mostly for Taber acreage, established a new record. Over 15,000 acres were taken up, mostly in small individual lots, in the first few days after the strike, in addition to a prospecting permit covering 10,240 acres. The Canadian Western Natural Gas, Light, Heat & Power Co. of Calgary leased several thousand acres. Holdings of Taber Oil Corp. cover 4,000 acres.

Extensive geological work and drilling of numerous structure tests preceded the location of Plains Petroleum No. 1. It is estimated that a well can be drilled to the Ellis sand in this area for around $13,000.

The strike opens up a large potential oil area extending from the Plains Petroleum No. 1 location to the Skiff field, where Devenish Petroleums secured some heavy crude production a number of years ago. To the west, a test by Hudson's Bay Oil & Gas Co. in the Keho Lake area got a small production in the Benton formation, while potentialities have been indicated by isolated deep tests all the way south to the Del Bonita structure a short distance north of the Cut Bank field.

If the Taber producer holds up under a steady production test, considerable additional drilling will be started in the immediate vicinity this spring. It is the first test in southern Alberta to secure commercial production in the Ellis formation.

Turner Valley Completions

On the west flank of the South Turner Valley structure, West Side Royalties No. 1, LSD 3, section 21-18-2w5, bottoming in the Madison limestone at 6,379 feet, is on steady production and making around 227 bbls. of 47.9 gravity crude per day. From 8 to 10 per cent of water is coming with the crude, but this is drilling fluid and when it is cleared the crude production is expected to increase.

In the same section, Newfold Royalties No. 1, LSD 11, bottoming 444 feet in the lime at 6,254 feet, is bailing and testing production. Wet gas flow estimated around 2,500,000 feet a day with 1,000 feet of drilling fluid still in the hole. It looks like a fair naphtha producer.

The next completion is likely to be Royalite Oil Co. No. 4 Sterling Pacific, LSD 4, section 33-18-2w5, offsetting Turner Valley Royalties No. 1 to the north. This test got the Madison unusually deep at 6,734 feet and is below 6,974 feet with production expected around 7,150 feet.

In the West Central area, Dalhousie Oil Co. No. 8, LSD 6, section 30-19-2w5, is below 6,349 feet after getting the lime at 6,178 feet. It has changed over from rotary mud to oil.

West Side Drilling

In the West Central area, Kermac Petroleums No. 1, LSD 16, section 18-19-2w5, is moving derrick to location and has purchased equipment. Test will be carried to around 3,500 feet with standard tools and completed with rotary.

In section 5-19-2w5, Mercury Royalties No. 1, LSD 8, is below 2,200 feet. Mercury Oils No. 8, LSD 3, section 4-19-2w5, is below 1,560 feet.

In section 32-18-2w5, Royal Crest Petroleums No. 1, LSD 9, has derrick up and rigging will start as soon as rotary equipment from Westside No. 1 is available.

In section 28-18-2w5, Richland Royalties No. 1, NE half LSD 12, is below 500 feet. Richland No. 2, LSD 5, is cleaning to old bottom at 4,050 feet. Richland No. 3, LSD 14, is drilling and carrying 10¾-inch casing below 4,500 feet. Three Point Petroleums No. 1, LSD 12, same section, is working on derrick. Model-Spooner-Reward No. 1, LSD 4, same section, is moving equipment to location and will spud by the end of March.

In section 29-18-2w5, Granville Oils No. 1, LSD 16, is rigging up rotary outfit offsetting Turner Valley Royalties No. 1 immediately to the west. Commoil No. 1, LSD 15, same section, has rotary outfit from Sovereign Royalties well on the ground, and will spud about the end of March. Also Oils No. 1, LSD 13, same section, is being financed by Calgary and English capital for a test nearly a mile west of Turney Valley Royalties No. 1 producer. Share Royalties No. 1, N half LSD 8, same section, is moving derrick from Okotoks. Globe Royalties No. 1, LSD 7, has let contract to Union Drilling Co., of Galgary, and will use combination outfit.

In LSD 2, same section, Davies Petroleums No. 1 has spudded. Combination outfit is being moved in for Sunburst Oil Co. No. 1, N half LSD 1, same section.

In section 21-18-2w5, Davies Petroleums and Royalite Oil Co. No. 2, LSD 13, has derrick up.

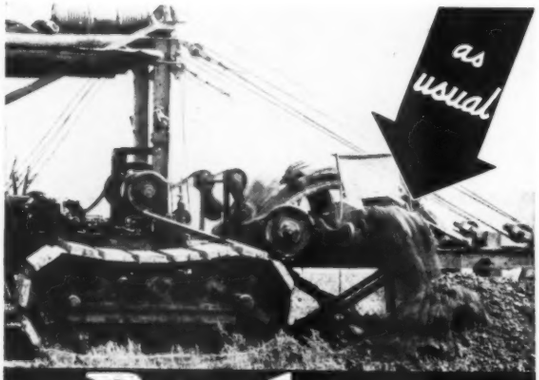
In section 20-18-2w5, Spy Hill Royalties, Ltd., of Calgary, is preparing for No. 1 test in LSD 16, on acreage of Okalta Oils, Ltd. Monarch Royalties No. 1, LSD 9, same section, is below 2,000 feet. Brown Oil Corp. No. 2, LSD 8, is working on derrick.

In section 17-18-2w5, Prairie Royalties No. 1, LSD 16, is below 313 feet and preparing to set surface pipe. Location is a half mile southwest of Foundation Royalties No. 1 producer, and the farthest south active drilling.

In section 16-18-2w5, Brown Oil Corp. No. 1, LSD 14, is working on derrick. Firestone Petroleums No. 1, LSD 13, has preliminary work finished and is waiting for rotary outfit. Royal Canadian Oil Co. No. 1, LSD 4, has let drilling contract to the Union Drilling Co. of Calgary. Revenue Petroleums, Ltd., incorporated by Saskatchewan interest, is preparing for a test in N half LSD 15, immediately southeast of Westside Royalties No. 1 producer.

West Crest Petroleums, Ltd., of Calgary, is letting contract for completion of Rand Petroleum (formerly Nolan-Hungerford Royalties) No. 1, S half LSD 5, section 34-18-2w5, which has been standing for some months at around 4,000 feet. Drilling will resume early in April. On completion of this well, West Crest No. 2 will be started in LSD 16, section 24-19-3w5, south and west of Dalhousie Oil Co. No. 8. Officers of the company are: President, Austin B. Claypool; vice president, William J. Maughan; secretary-treasurer, R. M. Van Bibber; managing director, Walter B. Hooker; directors, Dr. J. S. Burrill, G. W. H. Millican.

Soturn Oils, financed by British Columbia capital, has been incorporated at Vancouver to test acreage in NE quarter section 5-18-2w5. This is the farthest south location in the field and over 2 miles south of production.



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WILDCAT OPERATIONS

CALIFORNIA

IMPORTANT WELLS AND NORTHERN CALIFORNIA WILDCATS

Company, well and location—	S.T.R.	Depth	Status
Shell Oil Co., No. 1-20 Capitan, Santa Barbara Co.	32- 5-30	957	sd. sh. drlg.
Shell Oil Co., No. 1-23 Capitan, Santa Barbara Co.	32- 5-30	1,305	flow. 344 b.d.
Barnsdall-Rio Grande, No. 19 Elwood, Santa Barbara	15- 4-29	3,636	recmtd. 3,627
Signal Oil Co., No. 98-9 Elwood, Santa Barbara Co.	tideland	3,914	flow. 100 b.d.
Bush Oil Co., No. 4 Santa Maria, Santa Barbara Co.	30-10-33	4,510	reaming
Ericksson, G., No. 1 Santa Maria, Santa Barbara Co.	16-10-34	1,250	sd. sh. drlg.
Union Oil Co., No. 2-A Santa Maria, Santa Barbara Co.	30-10-33	3,791	flow. 4,290 b.d.
Union Oil Co., No. 1-0 Santa Maria, Santa Barbara Co.	21-10-34	1,450	sd. sh. drlg.
Union Oil Co., No. 12 Orcutt, Santa Barbara Co.	26- 9-34	3,930	O.S. drlg.
Union Oil Co., No. 17 Orcutt, Santa Barbara Co.	26- 9-34	3,770	sd. sh. drlg.
Barnsdall Oil Co., No. 6 Gato Ridge, Santa Barbara Co.	9- 8-32	1,870	sd. sh. drlg.
Barnsdall Oil Co., No. 9 Gato Ridge, Santa Barbara Co.	9- 8-32	2,465	pump 1105 b.d.
Field Gasoline Corp., No. 1 Gato Ridge, Santa Barbara	4- 8-32	3,111	sd. sh. drlg.
Stewart-Carter Oil, No. 1 Gato Ridge, Santa Barbara	4- 8-32	2,311	cmtd. 2,160
Nine Springs Oil Co., No. 1 Los Olivos, Santa Barbara	9- 7-30	3,100	sd. sh. drlg.
Fisher, Dan, No. 1 Cuyama, Santa Barbara Co.	28-11-28	646	sd. sh. drlg.
Texas Co., No. 132 Shiells, Ventura Co.	4- 3-19	3,123	swabbing
Calumet Oil Co., No. 16 Shiells, Ventura Co.	3- 3-19	4,317	cmtd. 3,220
Condor Oil Co., No. 1 Sespe, Ventura Co.	6- 4-19	1,571	br. sh. drlg.
Merchants Pet. Co., No. 7 Sespe, Ventura Co.	1- 4-20	700	sd. sh. drlg.
Speik Oil Co., No. 2 Sespe, Ventura Co.	33- 5-19	1,952	sd. sh. drlg.
Colima Oil Co., No. 2 Sespe, Ventura Co.	25- 5-19	2,040	O.S. drlg.
Bolsa Chica Oil Co., No. 4 Temescal, Ventura Co.	4- 4-18	3,534	pump. 150 b.d.
Bolsa Chica Oil Co., No. 5 Temescal, Ventura Co.	5- 4-18	760	sd. sh. drlg.
Pacific Western Oil Co., No. 10 Temescal, Ventura Co.	3- 4-18	2,241	sd. sh. drlg.
St. Louis Oil Co., No. 3 Ojai, Ventura Co.	13- 4-24	679	hd. sd. drlg.
Continental Oil Co., No. 1 Red Mountain, Ventura Co.	7- 3-23	5,644	fish. D.P.
C. C. M. Oil Co., No. 2 Padre Canyon, Ventura Co.	23- 3-24	6,465	redrlg. 2,820
C. C. M. Oil Co., No. 5-A Padre Canyon, Ventura Co.	15- 3-24	2,397	sd. sh. drlg.
Continental Oil Co., No. 3 Padre Canyon, Ventura Co.	15- 3-24	2,602	fish. D.P.
Honolulu Oil Corp., No. 1 South Mountain, Ventura Co.	23- 3-21	6,744	cleaning out
Calco Pet. Corp., No. 4 South Mountain, Ventura Co.	17- 3-20	3,810	sd. sh. drlg.
Associated Oil Co., No. 27 Hartman, Ventura, Ventura	22- 3-23	5,930	rig. to pump
Associated Oil Co., No. 25 V.L.W., Ventura, Ventura	23- 3-23	7,055	flow. 101 b.d.
Associated Oil Co., No. 28 Lloyd, Ventura, Ventura	27- 3-23	6,850	flow. 35 b.d.
Associated Oil Co., No. 29 Lloyd, Ventura, Ventura	27- 3-23	3,301	sd. sh. drlg.
Associated Oil Co., No. 64 Lloyd, Ventura, Ventura	27- 3-23	3,510	sd. sh. drlg.
Associated Oil Co., No. 66 Lloyd, Ventura, Ventura	27- 3-23	1,080	sd. sh. drlg.
Associated Oil Co., No. 137 Lloyd, Ventura, Ventura	27- 3-23	4,431	sd. sh. drlg.
Shell Oil Co., No. 89 Taylor, Ventura, Ventura Co.	30- 3-23	7,773	O.S. drlg.
Shell Oil Co., No. 34 Gosnell, Ventura, Ventura Co.	23- 3-23	7,121	cleaning out
General Pet. Corp., No. 17 Barnard, Ventura, Ventura	23- 3-23	6,695	test W.S.O.
Continental Oil Co., No. 6 San Miguelito, Ventura Co.	24- 3-24	6,160	O.S. drlg.
C. C. M. Oil Co., No. 13-B Rincon, Ventura Co.	8- 3-24	3,417	reaming
General Pet. Corp., No. 3-A Rincon, Ventura Co.	8- 3-24	4,512	rig. to pump
Lube Oil Co., No. 1 Devils Den, Kern Co.	2-25-18	4,285	reaming
Standard Oil Co., No. 3 United, Lost Hills, Kern Co.	2-26-20	1,407	rig. to pump
Peters Royalty Corp., No. 2 McKittrick, Kern Co.	32-29-22	1,698	rig. to pump
Welport Oil Co., No. 18 McKittrick, Kern Co.	26-29-21	531	sd. sh. drlg.
Continental Oil Co., No. 1 Wasco, Kern Co.	8-27-24	9,545	fish. bailer
Seaboard Oil Corp., No. 1 Wasco, Kern Co.	26-27-24	3,641	sd. sh. drlg.
Belridge Oil Co., No. 14-35 North Belridge, Kern Co.	35-27-20	8,400	flow. 530 b.d.
Belridge Oil Co., No. 24-35 North Belridge, Kern Co.	35-27-20	4,844	sl. sh. drlg.
Belridge Oil Co., No. 62-27 North Belridge, Kern Co.	27-27-20	7,000	br. sh. drlg.
Belridge Oil Co., No. 21-1 North Belridge, Kern Co.	1-28-20	5,997	br. sh. drlg.
Doyle Pet. Co., No. 2 Quinn, Jasmine, Kern Co.	15-25-27	980	sd. sh. drlg.
Calif. Western Oil Co., No. 2 Round Mountain, Kern	12-28-28	2,084	pump. 290 b.d.
Honolulu Oil Corp., No. 6 Round Mountain, Kern Co.	18-28-29	1,840	O.S. drlg.
Italo Pet. Co., No. 1 Kern Front, Kern Co.	17-28-27	3,408	dry; abd.
Tide Water Associated, No. 3 Kern Front, Kern Co.	4-28-27	2,811	test. W.S.O.
M. H. Whittier Co., No. 4 Kern Front, Kern Co.	16-28-27	2,810	sd. sh. drlg.
Oil, Inc., No. 7-2 Kern Front, Kern Co.	13-28-27	1,000	sd. sh. drlg.
Cedar Oil Co., No. 3 Brown, Kern Front, Kern Co.	8-28-27	3,086	dry; abd.
Seskayden Oil Co., No. 4 Kern Front, Kern Co.	17-28-27	2,902	rig. to pump
California Star Oil Co., No. 7-80 Kern Front, Kern Co.	22-28-27	2,654	test. wet
California Star Oil Co., No. 9-40 Kern Front, Kern Co.	22-28-27	2,453	sd. sh. drlg.
Standard Oil Co., No. 4 Ward, Kern Front, Kern Co.	24-28-27	1,995	rig. to pump
Standard Oil Co., No. 5-9 Kern Front, Kern Co.	9-28-27	2,753	cmtd. 2,689
Pioneer Oil Co., No. 1 Kern Front, Kern Co.	18-28-28	1,115	completing
National Oil Co., No. 9 Gates, Kern Front, Kern Co.	2-28-29	1,450	cleaning out
McManus, Thomas, No. 3 Kern River, Kern Co.	2-29-28	451	sd. sh. drlg.
Superior Oil Co., No. 1 Bakersfield, Kern Co.	36-29-28	191	sd. sh. drlg.
Bojaki Oil Co., No. 1 Premier, Kern Co.	28-27-27	1,959	sd. sh. drlg.
Mines Oil Co., No. 4 Premier, Kern Co.	20-27-27	2,180	sd. sh. drlg.
Ring Oil Co., No. 3 Knapp, Mount Poso, Kern Co.	28-26-28	1,480	pump. 100 b.d.
Harp, E. J., No. 1 Mount Poso, Kern Co.	27-26-28	1,845	P.B. 1,460
C. C. M. Oil Co., No. 1 Alford, Mount Poso, Kern Co.	35-27-27	3,335	gr. sd. drlg.
W. H. G. Oil Co., No. 1 McVan, Mount Poso, Kern Co.	10-27-27	1,570	idle
Magee, H. H., No. 2 Fruitvale, Kern Co.	23-29-27	3,244	tested wet
H. & H. Oil Co., No. 1 Fruitvale, Kern Co.	23-29-27	3,256	cmtd. 3,232
Western Gulf Oil Co., No. 35 Fruitvale, Kern Co.	21-29-27	3,916	cmtd. 3,851
Geick, Edward, No. 1 Fruitvale, Kern Co.	23-29-27	3,136	cmtd. 3,092
Kasey & Associates, No. 1 Fruitvale, Kern Co.	23-29-27	3,114	P.B. 2,892
Exeter Oil Co., No. 2 Fruitvale, Kern Co.	21-29-27	1,580	sd. sh. drlg.
Pal-Pen Oil Co., No. 1 Fruitvale, Kern Co.	23-29-27	1,951	sd. sh. drlg.
Seahawk Pet. Co., No. 3 Fruitvale, Kern Co.	23-29-27	2,395	sd. sh. drlg.
Banducci, L. J., No. 2-T Fruitvale, Kern Co.	26-29-27	3,315	sd. sh. drlg.
Magnet Oil Co., No. 4 Fruitvale, Kern Co.	21-29-27	4,160	tested wet
Trico Oil & Gas Co., No. 2 Fruitvale, Kern Co.	23-29-27	3,231	sd. sh. drlg.
Vesta Oil Co., No. 1 Mountain View, Kern Co.	19-30-29	5,250	sd. sh. drlg.
Wood-Callahan Oil Co., No. 3 Mountain View, Kern Co.	25-30-28	5,965	cmtd. 5,474
Hogan Pet. Co., No. 4 Symons, Mountain View, Kern	5-31-29	5,576	sd. sh. drlg.
Hogan Pet. Co., No. 8 Wharton, Mountain View, Kern	32-30-29	5,000	sd. sh. drlg.
Liko Pet. Co., No. 1 Mountain View, Kern Co.	19-30-29	4,995	sd. sh. drlg.
Ohio Oil Co., No. 1-B Derby, Mountain View, Kern Co.	33-30-29	5,819	sd. sh. drlg.
Trico Oil Co., No. 2 Wilson, Mountain View, Kern Co.	13-30-28	3,194	sd. sh. drlg.
Mohawk Pet. Co., No. 2-C Mountain View, Kern Co.	30-30-29	5,955	pump. 250 b.d.
Mohawk Pet. Co., No. 9-C Mountain View, Kern Co.	30-30-29	3,770	sd. sh. drlg.
Johnson-Leaf Oil Co., No. 1 Edison, Kern Co.	24-30-29	1,525	redrlg. 1,300
Mohawk Pet. Co., No. 3 Earl, Arvin, Kern Co.	4-31-29	5,358	flow. 1,000 b.d.
General Pet. Corp., No. 1 Arvin, Kern Co.	26-31-29	7,462	P.B. 7,454
Bear Mountain Oil Co., No. 1 Arvin, Kern Co.	21-31-30	2,160	sd. sh. drlg.
Arkelo Oil Co., No. 1 Lerdo, Kern Co.	23-28-26	9,550	gr. sd. drlg.
Associated Oil Co., No. 1 Rio Bravo, Kern Co.	30-29-25	8,825	sd. sh. drlg.
Continental Oil Co., No. 1 Rosedale, Kern Co.	12-29-26	5,000	sd. sh. drlg.
Standard Oil Co., No. 11-2 Greeley, Kern Co.	20-29-26	7,799	sd. sh. drlg.
Standard Oil Co., No. 11-3 Greeley, Kern Co.	20-29-26	6,805	sd. sh. drlg.
Standard Oil Co., No. 12-1 Greeley, Kern Co.	30-29-26	7,710	sd. sh. drlg.
Standard Oil Co., No. 14-1 Greeley, Kern Co.	4-30-26	7,391	sd. sh. drlg.
Mohawk Pet. Co., No. 1 Greeley, Kern Co.	23-29-25	4,560	sd. sh. drlg.
Union Oil Co., No. 1 San Emidio, Kern Co.	34-11-22	4,540	sd. sh. drlg.
Shell Oil Co., No. 78-30 Ten Section, Kern Co.	30-30-26	8,474	P.B. 8,215
Shell Oil Co., No. 23-30 Ten Section, Kern Co.	30-30-26	4,359	sd. sh. drlg.
Signal Oil & Gas Co., No. 1 Ten Section, Kern Co.	21-30-27	7,000	sd. sh. drlg.
Superior Oil Co., No. 8 Ten Section, Kern Co.	11-30-26	10,409	cmtd. 10,380
Ohio Oil Co., No. 4-A Buena Vista Lake, Kern Co.	32-31-26	5,110	sd. sh. drlg.
C. C. M. Oil Co., No. 26-21 Midway-Sunset, Kern Co.	21-32-23	2,335	pump. 50 b.d.
C. C. M. Oil Co., No. 33-21 Midway-Sunset, Kern Co.	21-32-23	2,635	rig. to pump
C. C. M. Oil Co., No. 1-J Midway-Sunset, Kern Co.	21-32-23	2,200	rig. to pump
Midcrude Oil Co., No. 2 Midway-Sunset, Kern Co.	22-32-23	1,590	sd. sh. drlg.
Hallmark Oil Co., No. 6 Fried, Midway-Sunset, Kern	25-12-24	2,896	P.B. 2,830
General Pet. Corp., No. 49 Midway-Sunset, Kern Co.	24-31-23	4,424	bailing
R. & W. Oil Co., No. 4 Midway-Sunset, Kern Co.	6-11-23	3,420	sd. sh. drlg.
Berry Oil Co., No. 21 Midway-Sunset, Kern Co.	34-12-24	831	rig. to pump
Merritt-Annex Oil Co., No. 4 Midway-Sunset, Kern Co.	25-12-24	2,696	sd. sh. drlg.
Standard Oil Co., No. 79-33-D Midway-Sunset, Kern	33-32-24	3,005	sd. sh. drlg.
Standard Oil Co., No. 39-23-D Midway-Sunset, Kern	23-32-24	3,708	P.B. 3,365
Standard Oil Co., No. 7-33-D Midway-Sunset, Kern	33-32-24	2,565	sd. sh. drlg.
Standard Oil Co., No. 52-33-D Midway-Sunset, Kern	33-32-24	2,899	sd. sh. drlg.
Richfield Oil Co., No. 12 Midway-Sunset, Kern Co.	6-32-23	1,635	P.B. 1,502
Richfield Oil Co., No. 8-A Midway-Sunset, Kern Co.	6-32-23	1,198	sd. sh. drlg.
North American Oil Co., No. 5 Midway-Sunset, Kern	25-12-24	3,521	sd. sh. drlg.
Texas Co., No. 19 Midway-Sunset, Kern Co.	32-24-24	2,796	sd. sh. drlg.
Union Oil Co., No. 5 Williams, Midway-Sunset, Kern	22-32-23	105	sd. sh. drlg.
Birch-Ranch Oil Co., No. 2 Midway-Sunset, Kern Co.	22-32-23	2,165	completing
Valley Oil Co., No. 1 Midway-Sunset, Kern Co.	18-32-23	2,498	br. sh. drlg.
Tide Water Associated, No. 31 Midway-Sunset, Kern	35-31-22	1,380	sd. sh. drlg.
Zamloch, Carl, No. 2 Midway-Sunset, Kern Co.	22-32-23	2,073	sd. sh. drlg.
Alford Oil Co., No. 8 Fried, Midway-Sunset, Kern Co.	25-12-24	1,350	sd. sh. drlg.
Quality Oil Co., No. 4 Bull, Midway-Sunset, Kern Co.	22-32-23	1,840	P.B. 1,176
Quality Oil Co., No. 5 Bull, Midway-Sunset, Kern Co.	22-32-23	1,600	cmtd. 1,565
Honolulu Oil Corp., No. 36 Midway-Sunset, Kern Co.	14-32-24	3,570	completing
Iriquois Oil Co., No. 1 Midway-Sunset, Kern Co.	7-11-23	1,729	pumn. 148 b.d.
Petrolia Royalties, No. 1 Midway-Sunset, Kern Co.	21-32-22	1,160	bailing
Buffalo Oil Co., No. 1 Tejon, Kern Co.	5-10-19	4,430	idle
Reserve Oil & Gas Co., No. 33-1 Tejon, Kern Co.	32-11-19	4,969	idle
Reserve Oil & Gas Co., No. 33-2 Tejon, Kern Co.	33-11-19	4,474	flow. 200 b.d.
Reserve Oil & Gas Co., No. 33-3 Tejon, Kern Co.	33-11-19	4,431	flow. gas
Ohio Oil Co., No. 2 Tejon, Kern Co.	21-11-19	6,950	sd. sh. drlg.
Western Gulf, No. 3 Cantua, Fresno Co.	3-17-15	8,530	cleaning out
Union Oil Co., No. 2 Kettleman North, Fresno Co.	29-21-17	8,500	redrlg. 6,823
K. N. D. A., No. 4-8-J Kettleman North, Fresno Co.	18-21-17	9,400	redrlg. 9,170
K. N. D. A., No. 36-28-J Kettleman North, Fresno Co.	28-21-17	7,720	O.S. drlg.
K. N. D. A., No. 56-28-J Kettleman North, Fresno Co.	28-21-17	1,621	sd. sh. drlg.
K. N. D. A., No. 65-28-J Kettleman North, Fresno Co.	28-21-17	6,401	br. sh. drlg.
K. N. D. A., No. 83-24-H Kettleman North, Fresno Co.	24-21-16	8,935	P.B. 8,882
K. N. D. A., No. 85-32-J Kettleman North, Fresno Co.	32-21-17	8,485	redrlg. 8,300
K. N. D. A., No. 63-34-J Kettleman North, Fresno Co.	34-21-17	6,194	br. sh. drlg.
K. N. D. A., No. 61-4-P Kettleman North, Fresno Co.	4-22-17	3,874	sd. sh. drlg.
Associated Oil Co., No. 3 Kettleman North, Kings Co.	35-21-17	8,858	P.B. 6,965
Standard Oil Co., No. 8-19-J Kettleman North, Fresno	19-21-17	8,425	sd. sh. drlg.
Standard Oil Co., No. 85-19-J Kettleman North, Fresno	19-21-17	8,619	P.B. 8,240

KEY TO ABBREVIATIONS USED IN DRILLING REPORTS

Abd., abandoned.
Bldg., building.
B.D., barrels daily.
B.P., back pressure.
B.R., building rig.
Br. sh., brown shale.
B.S., basic sediment.
C.P., casing pressure.
Cd or Crd., cored.
C.D., corrected depth.
Cg., coring.
C.L., center line.
Cmtd., cemented.
C.O., cleaning out.
Comp., completed.
Compr., compressor.
C.P., casing pressure, also cement through perforations.
Csg., casing.
D.D., drilling (or drilled) deeper.
Drlg. or Drg., drilling.
Drk. or Dk., derrick.
D.S., drill stem.
D.&A., dry and abandoned.
Fsg., fishing.
Gbo., gumbo.
G.I., gas injection.
Gr., gravity.
Gr. sd., gray sand.
Grn. sh., green shale.
Hd. sd., hard sand.
H.F.W., hole full of water.
I.P., initial production.
L., lime.
L.D.D., later drilled deeper.
Lnr., liner.
Loc., location.
M.I.M., moving in material.
M.I.R., moving in rig.
M.I.R.T., moving in rotary tools.
M.O.T., milling on tools.
O.I.H., oil in hole.
O.S., oil sand.
O.T.D., old total depth.
O.W.D.D., old well drilling deeper.
O.W.P.B., old well plugging back.
P.B., plugging or plugged back.
P.B.P., pulling big pipe.
P.L., pipe line.
P.L.O., pipe line oil.
Pmpg., pumping.
P.O.P., putting on pump.
P.P., pulled pipe.
Rd. sd., red sand.
Rd. sh., red shale.
Recmt., recemented.
Rmg., reaming.
Redrlg., redrilling.
Rng., running.
R.O.G., rig on ground.
R.P., rock pressure.
R.U., rigging up.
R.U.R., rigging up rotary.
R.U.R.T., rigging up rotary tools.
R.U.S.T., rigging up standard tools.
R.&T., rods and tubing.
S. or Sd., sand.
S.D., shut down.
Sd. sh., sandy shale.
Sdtr., or St., sidetracking.
S.D.P.L., shut down for pipe line.
S.D.W.O., shut down awaiting orders.
S.G., show gas.
Sh.&L., shale and lime.
S.I., shut in.
S.I.P., shut in, prorated.
S.L.M., steel line measurement.
S.O., show oil.
S.O.G.&W., show of oil, gas and water.
Spdg. or Spd., spudding.
S.R., straightreaming.
Stdg., standardizing (also standing).
S.W., salt water.
Swbg., swabbing.
T.A., temporary abandoned.
Tbg., tubing.
T.D., total depth.
T.P., tubing pressure.
Tr., tract.
U.R., underreaming.
W.I.H., water in hole.
W.O., workover.
W.O.C. or W.O.C.S., waiting on cement to set.
W.P., working pressure.
W.S.O., water shutoff.
W.S.O.O.K., water shutoff O.K.
W.S.O.N.G., water shutoff no good.
W.S.R. or W.O.S.R., wait on standard rig.
Wtr., water.

Standard Oil Co., No. 38-33-J Kettleman North, Fresno	33-21-17	7,109	sd. sh. drlg.
Standard Oil Co., No. 81-33-J Kettleman North, Fresno	33-21-17	130	sd. sh. drlg.
Standard Oil Co., No. 78-3-P Kettleman North, Kings	3-22-17	6,421	sd. sh. drlg.
Temblor Oil Co., No. 1 Kettleman Middle, Kings Co.	25-23-18	5,935	cleaning out
Central Cal. Utilities, No. 3 Dudley, Kings Co.	11-23-19	1,221	cmtd. 778
Norell, T. G., No. 1 Tulare Lake, Kings Co.	7-21-21	6,179	resume work
Stone, G. S., No. 1 Tulare Lake, Kings Co.	25-20-20	1,101	cmtd. 700
Tide Water Associated Oil Co., No. 2 Avenal, Kings	35-23-17	2,230	O.S. drlg.
Barnsdall Oil Co., No. 1 K.C.L., San Luis Obispo Co.	1-32-20	1,751	sd. sh. drlg.
Calif. Producing Co., No. 1 Pattiway, San Luis Obispo	19-10-24	751	sd. sh. drlg.
Aviation Oil Co, No. 1 Callender, San Luis Obispo Co.	10-11-35	1,935	idle
Temblor Oil Co., No. 1 Panorama, San Luis Obispo Co.	22-32-21	140	sd. sh. drlg.
Lewis, A. O., No. 1 Pecho, San Luis Obispo Co.	34-30-10	2,310	cleaning out
Martin, J. D., No. 4-A Pismo, San Luis Obispo Co.	5-32-13	3,262	cleaning out
Texas Co., No. 1 King City, Monterey Co.	30-19-7	3,275	sd. sh. drlg.
Shell Oil Co., No. 1 Pleyto, Monterey Co.	34-24-10	8,994	P.B. 8,750
Shell Oil Co., No. 2 Pleyto, Monterey Co.	34-24-10	7,114	sd. sh. drlg.
Texas Co., No. 2 Eureka, Humboldt Co.	22- 3-1	7,418	reaming
Amerada Pet. Co., No. 1 Mayhood, Rio Vista, Solano	35- 4-2	4,532	sd. sh. drlg.
Associated Oil Co., No. 1 Sargent, San Benito Co.	5-12-4	6,476	sd. sh. drlg.
Buttes Oilfields, Ltd., No. 1 Kent, Sutter Co.	2-15-1	5,210	cleaning out
Jennings, E. P., No. 1 Allensworth, Tulare Co.	4-24-23	2,709	P.B. 2,690

IMPORTANT WELLS AND SOUTHERN CALIFORNIA WILDCATS

Company, well and location—	S.T.R.	Depth	Status
Caminol Oil Co., No. 1 El Segundo, Los Angeles Co.	18- 3-14	7,310	no kick
Caminol Oil Co., No. 2 El Segundo, Los Angeles Co.	18- 3-14	7,301	swabbed dry
Richfield Oil Co., No. 4 El Segundo, Los Angeles Co.	18- 3-14	7,535	cleaning out
Ohio Oil Co., No. 3 El Segundo, Los Angeles Co.	7- 3-14	1,050	sd. sh. drlg.
Texas Co., No. 2-1 El Segundo, Los Angeles Co.	17- 3-14	7,756	gr. sd. drlg.
Texas Co., No. 1 Security, El Segundo, Los Angeles	18- 3-14	7,253	cmtd. 7,165
Republic Pet. Co., No. 3 El Segundo, Los Angeles Co.	18- 3-14	7,401	flow. 200 b.d.
Republic Pet. Co., No. 4 El Segundo, Los Angeles Co.	18- 3-14	7,320	sd. sh. drlg.
Republic Pet. Co., No. 5 El Segundo, Los Angeles Co.	18- 3-14	7,018	sd. sh. drlg.
Royalty Service Corp., No. 1 El Segundo, Los Angeles	7- 3-14	7,290	sd. sh. drlg.
Union Oil Co., No. 1 El Segundo, Los Angeles Co.	18- 3-14	7,685	flow. 1,500 b.d.
Leora Oil Co., No. 1 Hermosa, Los Angeles Co.	31- 3-14	4,675	sd. sh. drlg.
Bryan & Young, No. 1 Lawndale, Los Angeles Co.	20- 3-14	6,480	idle
Signal Finance Co., No. 1 Hawthorne, Los Angeles Co.	10- 3-14	9,395	fish. tubing
Imperial Gypsum, No. 1 Moneta, Los Angeles Co.	35- 3-14	7,209	dry; abd.
C. C. M. Oil Co., No. 15 Torrance, Los Angeles Co.	31- 4-14	3,665	sd. sh. drlg.
Two & One Oil Co., No. 6 Torrance, Los Angeles Co.	31- 3-14	4,205	sd. sh. drlg
Willett, P. W., No. 1 Torrance, Los Angeles Co.	18- 4-14	3,083	test. W.S.O.
Hunt Oil Co., No. 1 Torrance, Los Angeles Co.	18- 4-14	4,400	pump. 100 b.d.
Abrams, J., & Associates, No. 1 Torrance, Los Angeles	16- 4-14	4,068	cleaning out
Calmore Oil Co., No. 1 Torrance, Los Angeles Co.	31- 3-14	3,290	sd. sh. drlg.
Swyer Oil Co., No. 1 Torrance, Los Angeles Co.	18- 4-14	3,400	sd. sh. drlg.
McLaren & Associates, No. 1 Palos Verdes, Los Angeles	27- 4-14	3,992	reaming
Country Club Oil Co., No. 1 Inglewood, Los Angeles	19- 2-14	2,750	br. sh. drlg.
Standard Oil Co., No. 82 Inglewood, Los Angeles Co.	8- 2-14	3,500	cmtd. 3,435
Shell Oil Co., No. 89 Reyes, Dominguez, Los Angeles	33- 3-13	6,692	P.B. 6,625
Shell Oil Co., No. 90 Reyes, Dominguez, Los Angeles	33- 3-13	7,886	sd. sh. drlg.
Union Oil, No. 50 Callender, Dominguez, Los Angeles	33- 3-13	9,695	sd. sh. drlg.
Union Oil, No. 52 Callender, Dominguez, Los Angeles	33- 3-13	3,890	sd. sh. drlg.
Union Oil, No. 53 Callender, Dominguez, Los Angeles	33- 3-13	6,737	sd. sh. drlg.
Union Oil, No. 9 Carson, Dominguez, Los Angeles Co.	33- 3-13	7,301	sd. sh. drlg.
Barnsdall Oil Co., No. 10 Rosecrans, Los Angeles Co.	20- 3-13	7,664	flow. 550 b.d.
Shell Oil Co., No. 1 Rosecrans, Los Angeles Co.	20- 3-13	7,744	P.B. 7,602
Hildon Oil Co., No. 1 Flood Control, Los Angeles Co.	11- 4-13	5,684	pump. 100 b.d.
Union Oil Co., No. 16 D.R., Playa Del Rey, Los Angeles	27- 2-15	6,097	sd. sh. drlg.
Barnsdall Oil Co., No. 1 Newhall, Los Angeles Co.	26- 3-17	6,472	completing
Burt, A. G., No. 1 Newhall, Los Angeles Co.	36- 4-17	574	sd. sh. drlg.
Holbrook Oil Co., No. 1 Newhall, Los Angeles Co.	28- 4-16	4,453	gr. sd. drlg.
Selegna Oil Co., No. 3 Wilmington, Los Angeles Co.	33- 4-13	3,588	sd. sh. drlg.
General Pet. Corp., No. 2-E Wilmington, Los Angeles	5- 5-13	3,600	O.S. drlg.
General Pet. Corp., No. 4-3 Wilmington, Los Angeles	5- 5-13	2,875	sd. sh. drlg.
General Pet. Corp., No. 1-F Wilmington, Los Angeles	33- 4-13	3,559	sd. sh. drlg.
General Pet. Corp., No. 1 Ford, Wilmington, L. Angeles	4- 5-13	2,476	reaming
General Pet. Corp., No. 2 Ford, Wilmington, L. Angeles	4- 5-13	2,361	sd. sh. drlg.
General Pet. Corp., No. 3 Ford, Wilmington, L. Angeles	4- 5-13	1,297	sd. sh. drlg.
Getty Oil Co., No. 3 Wilmington, Los Angeles Co.	33- 4-13	3,060	sd. sh. drlg.
Getty Oil Co., No. 4 Wilmington, Los Angeles Co.	33- 4-13	1,950	sd. sh. drlg.
Brain, Cooper & Haney, No. 1 Wilmington, Los Angeles	33- 4-13	3,475	sd. sh. drlg.
Bankline Oil Co., No. 1-T Wilmington, Los Angeles Co.	33- 4-13	3,106	cmtd. 3,045
Bankline Oil Co., No. 1 C.Y., Wilmington, Los Angeles	34- 4-13	2,854	sd. sh. drlg.
Crail Bros., Inc., No. 1 Wilmington, Los Angeles Co.	33- 4-13	1,650	sd. sh. drlg.
Pongratz Oil Co., No. 1 Wilmington, Los Angeles Co.	33- 4-13	2,175	sd. sh. drlg.
Union Pacific R.R. Co., No. 1 Wilmington, Los Angeles	4- 5-13	2,443	sd. sh. drlg.
Union Pacific R.R. Co., No. 2 Wilmington, Los Angeles	4- 5-13	2,420	sd. sh. drlg.
Union Pacific R.R. Co., No. 3 Wilmington, Los Angeles	4- 5-13	1,650	sd. sh. drlg.
Wilbur, V.R.G., No. 1 Wilmington, Los Angeles Co.	4- 5-13	3,592	cmtd. 3,350
Pacific Western Oil, No. 1-M Wilmington, Los Angeles	33- 4-13	2,585	flow. 550 b.d.
Ring Oil Co., No. 1 Wilmington, Los Angeles Co.	33- 4-13	1,510	sd. sh. drlg.
Royalty Service, No. 22-7 Wilmington, Los Angeles	33- 4-13	2,605	cmtd. 2,567
Royalty Service, No. 2-C Wilmington, Los Angeles	5- 5-13	3,758	P.B. 3,685
Hall, F. C., No. 1 Wilmington, Los Angeles Co.	5- 5-13	3,510	sd. sh. drlg.
Gilmore Oil Co., No. 842-1 Wilmington, Los Angeles	33- 4-13	2,541	sd. sh. drlg.
Gauthier Oil Co., No. 2 Wilmington, Los Angeles Co.	27- 4-13	3,600	reaming
Drillers, Inc., No. 1 Whittier, Los Angeles Co.	22- 2-11	1,271	sd. sh. drlg.
Honolulu Oil Corp., No. 1 Puente, Los Angeles Co.	15- 2-10	3,501	gr. sd. drlg.
Richfield Oil Co., No. 2 Nutt, Montebello, Los Angeles	5- 2-11	5,856	will P.B.
Richfield Oil Co., No. 1 Estrada, Montebello, L. Angeles	5- 2-11	3,764	sd. sh. drlg.
Universal Consd., No. 1-J Nutt, Montebello, L. Angeles	5- 2-11	5,860	flow. 150 b.d.
Texas Co., No. 16 Baldwin, Montebello, Los Angeles	6- 2-11	5,425	sd. sh. drlg.
St. Helens Pet., No. 6 P. & R., Montebello, L. Angeles	5- 2-11	7,199	cleaning out
Union Oil Co., No. 26 Montebello, Los Angeles Co.	1- 2-12	3,643	sd. sh. drlg.
Texas Co., No. 13 H.K., Long Beach, Los Angeles Co.	19- 4-12	1,510	sd. sh. drlg.
Hobbs Pet. Corp., No. 1 Long Beach, Los Angeles Co.	29- 4-12	2,960	pump. water
Hathaway, No. 2 Fulton, Santa Fe Springs, L. Angeles	6- 3-11	4,650	redrlg. 3,650
Union Oil Co., No. 100 Santa Fe Springs, Los Angeles	6- 3-11	10,300	sd. sh. drlg.
Julian & Criswell, No. 1 Walnut, Los Angeles Co.	5- 2-9	1,350	hd. sh. drlg.
Petroleum Co., No. 5 Wilson, Huntington, Orange Co.	2- 6-11	3,900	sd. sh. drlg.
Re-Mine Oil Co., No. 2 Huntington, Orange Co.	2- 6-11	4,400	cmtd.
Texas Co., No. 82 Brown, Huntington, Orange Co.	11- 6-11	1,790	sd. sh. drlg.
Richrow Oil Co., No. 2 Huntington, Orange Co.	34- 5-11	4,195	sd. sh. drlg.
Orco Oil Co., No. 5 Huntington, Orange Co.	2- 6-11	4,697	fish. D.P.
Commander Oil Co., No. 1 Newport, Orange Co.	29- 6-10	6,053	cmt. liner
Fullerton Oil Co., No. 20 Brea, Orange Co.	2- 3-10	5,154	redrlg. 5,051
Standard Oil Co., No. 62 Emery, West Coyote, Orange	13- 3-11	4,200	pump. 54 b.d.
Hogan Pet. Co., No. 1 Emery, West Coyote, Orange	23- 3-11	101	sd. sh. drlg.
Bandini Petroleum Co., No. 1 East Coyote, Orange Co.	17- 3-9	2,805	deepening
Dolicia Oil Co., No. 2 East Coyote, Orange Co.	24- 3-10	3,534	rig. to pump
Tide Water A. O. Co., No. 52 East Coyote, Orange Co.	13- 3-10	3,487	redrlg. 3,200
Standard Oil Co., No. 2-8 East Coyote, Orange Co.	22- 3-10	3,685	redrlg. 3,102
Shell Oil Co., No. 1 Mathis, Anaheim, Orange Co.	23- 4-10	4,342	sd. sh. drlg.
Joseph, Arthur, No. 1 Richfield, Orange Co.	29- 3-9	2,340	sd. sh. drlg.
Principal Oil Co., No. 1 Richfield, Orange Co.	36- 3-9	1,570	sd. sh. drlg.
Bachman Pet. Co., No. 1 Richfield, Orange Co.	29- 3-9	3,810	cleaning out
Union Oil Co., No. 29 Chapman, Richfield, Orange Co.	30- 3-9	8,610	fish. D.P.
Union Oil Co., No. 44 Chapman, Richfield, Orange Co.	29- 3-9	3,460	bailing
Union Oil Co., No. 45 Chapman, Richfield, Orange Co.	29- 3-9	3,465	sd. sh. drlg.
Union Oil Co., No. 8 Coyle, Richfield, Orange Co.	29- 3-9	2,450	sd. sh. drlg.

KANSAS

Week Ending March 20 (Descriptions are East unless marked otherwise)

Barton County

John Burton No. 1 Wendel, NE cor. sec. 13-19-11w. Sil. 3,346 ft.; drlg. 3,374 ft.

C. L. Carlock No. 1 Ehly, NE NE SE sec. 5-18-11w. Rlg.

C. L. Carlock et al No. 1 Leibel, SE NE SE sec. 18-18-11w. Anhy. 681 ft.; drlg. 1,520 ft.

George Dickey et al No. 1 Boger, SE SE NE sec. 15-16-13w. Cellar.

Hendon Drlg. Co. and Morgan & Flynn No. 1 Robenseifer, C NW sec. 7-18-15w. S.D. 430 ft.

Indian Terr. Illm. Oil Co. No. 1 Schrapel. SE SE NE sec. 26-20-11w. U.R. 6-in. at 3,261 ft.

S. L. Parks No. 1 Peach, SE cor. sec. 24-16-14w. Drlg. 2,300 ft.

C. L. Price et al No. 1 Kraft, SW NW NE sec. 10-17-11w. S.D. 2,555 ft.

Stanolind O. & G. Co. No. 2 Burmeister, NE NE SW sec. 33-19-11w. S.D. 3,355 ft.

E. F. Wakefield et al No. 1 Scheuerman, NE NE SW sec. 31-16-15w. Rlg.

Ralph Wixson and Union O. & G. Co. No. 1 Frederick, NW cor. sec. 12-16-13w. Drlg. 400 ft.

Butler County

A. M. Landon et al No. 1 McCaig, NE NE SE sec. 13-28-6. K.C. 2,070 ft.; drlg. 2,345 ft.

Rex & Morris No. 1 Gilmore, SE SE NE sec. 13-25-6. M.I. mch.

C. L. Seibel et al No. 1 Bisagno, SE SE NW sec. 24-25-6e. Spudded.

Vickers Pet. Co. No. 1 Voth, C N half NE NE sec. 32-24-4e. R.U.

Chase County

Propp et al No. 1 Fromm, SE cor. sec. 29-18-9e. Fsg. 2,440 ft.

Chautauqua County

Hugh & Wentz No. 1 Wells, SE SE NW sec. 10-33-10. M.I.M.

Ira Scott et al No. 1 Lamba, SW NW NE sec. 18-33-13. R.U.M.

E. J. Shaffer No. 1 Nuckolls, NW cor. sec. 12-33-19. Rng. 12-in. csg. 550 ft.

W. M. McKnab No. 1 Griffith, SW cor. sec. 11-32-10. R.U. mch.

Cowley County

Elmer Ash et al No. 1 Bolack, NW NW SE sec. 22-32-6. Cellar.

W. M. McKnabb No. 1 Community, C NE NW sec. 14-34-3e. O.W.D.D.; drlg. 3,485 ft.

W. M. McKnabb No. 1 Weldschmidt, SW SW NW sec. 18-34-6e. S.S.O. 2,949-52 ft.

Tom Palmer No. 1-A Lowe, SW SE SE sec. 3-32-5. Drlg. 540 ft.

Ryan Consolidated Co. No. 1 Couch, SW SW SE sec. 13-30-5. Drlg. 175 ft.

L. H. Wentz and Amerada Pet. Corp. No. 1 Rush, NW SW SW sec. 36-34-6e. Drlg. 1,760 ft.

Decatur County

C. L. Bruce et al No. 1 Newbold, C NE SE sec. 34-2s-28w. Loc.

Winkler & Koch No. 1 Vessey, C NW SE sec. 26-3-26w. Topeka 3,415 ft.; K.C. 3,460-3,826 ft.; S.D. 4,007 ft.

Elk County

L. H. Wentz et al No. 1 Love, SW SE NE sec. 35-30-9. Loc.

Ellis County

Bridgeport Machine Co. et al No. 1 Froelick, NW NW SE sec. 4-13-16w. R.U.

Empire O. & R. Co. No. 1 Hall, SE cor. sec. 2-12-17w. Drlg. 3,559 ft.

Ted Kors et al No. 1 Koblitz, SE SW NW sec. 23-12-18w. Pay 3,694-98 ft.; swb. 48 B.O. and swbd. down; T.D. 3,699 ft.; P.B. 3,697½ ft.; P. 13 B.O. and pmpd. off.

Lario O. & G. Co. et al No. 1 Cress, NE cor. sec. 13-11-17w. Sil. 3,293 ft. (cor.); T.D. 3,302½ ft.; 3,150 ft. O.I.H. in 3½ hrs.

Mazda Oil Co. No. 1 Henderson, SW SW NE sec. 27-11-18w. R.U.

Murphy Oil Co. No. 1 Wiesner, SE SE SW sec. 12-14-19w. U.R. 8-in. csg. at 3,470 ft.

Noble Pet. Corp. No. 1 O'Laughlin, NW NW SE sec. 13-12-19w. Drlg. 1,015 ft.

Sunray Oil Co. No. 1 Befort, NE cor. sec. 11-14-20w. Cong. 3,835 ft.; LaMotte 3,887 ft.; showing wtr.; S.D. 3,903 ft.

Earl Wakefield No. 1 Putnam Mortgage Co., SE SE NW sec. 32-15-17w. Drlg. 325 ft.

Winkler & Koch No. 1 Jensen, SW SW NE sec. 3-13-18w. S.D. 80 ft.

Ellsworth County

Frost et al No. 1 Dolechek, NE NE SW sec. 36-14-8w. Anhy. 570 ft.; drlg. 1,055 ft.

Finney County

Keith & Olson Drlg. Co. No. 1 Ely, NW NW SW sec. 34-22-29w. Topeka 3,460 ft.; cd. 4,387-96 ft.; no shows.

Grant County

Columbian Fuel Co. No. 1 Gray, C SE sec. 3-29-35w. T.D. 2,760 ft.; 4,000,000 ft. gas.

Greenwood County

L. S. Bolwanz No. 1 Travelers, C SW SW sec. 23-26-10. Spd.

Lauck & Moncrief No. 1 Gruber, NW cor. sec. 5-23-13. Set 10-in. csg. at 975 ft.

Ohio Oil Co. No. 1 Schwab, SE SW SE sec. 9-24-10. Viola 2,763-66 ft.; cmtd. 5-in. csg. at 2,763 ft.

Harper County

Carter Oil Co. et al No. 1 Seihart Est., C SW NW sec. 4-34-8w. Drlg. 2,150 ft.

Harvey County

Harburney Oil Co. No. 1 Schrag, NW NW SE sec. 24-22-3w. Viola 3,695 ft.; Wilcox 3,711 ft.; fsg.

Haskell County

Kuhn Bros. et al No. 1 Meredith, C SW sec. 10-30-33w. O.W.D.D.; Bridge 2,520 ft.; C.O.

Kearny County

J. L. Murphy No. 1 Campbell, NW NW SW sec. 32-25-35w. Anhy. 1,900 ft.; set 7-in. csg. at 2,780 ft.; S.D.

J. L. Murphy No. 1 Masonic Home, C NW sec. 1-26-36w. M.I.M.

Logan County

Rose Spring Drlg. Co. et al No. 1 Wright, C SE SE sec. 12-15-35w. Drlg. 3,525 ft.

Lyon County

Young et al No. 1-A Murphy, SE NW NE sec. 32-21-11. Fsg. 1,380 ft.

McPherson County

Bradley Bros. No. 1 Barnholt, SW SW SE sec. 30-20-5w. Drlg. 35 ft.

Fred C. Frank et al No. 1 Doles, SE NW NE sec. 12-19-1w. Spudded.

Hutchinson O. & G. Co. et al No. 1 Berg, SW SW SE sec. 15-20-3w. Drlg. 2,372 ft.

Smith et al No. 1 Larson, NW NW SW sec. 35-18-5w. M.I.M.

Wamhoff et al No. 1 Nuse, SE NE SW sec. 18-18-4w. R.U.R.

Mitchell County

Geo. Siedhoff et al No. 1 Greiss, SW SW SE sec. 16-8-10w. U.R. at 2,280 ft.

Ness County

Jones & Lane No. 1 Page Milling Co., SE SE NW sec. 36-18-26w. M.I.M.

Newton Dev. Co. No. 1 Tenny, NW NW SE sec. 19-18-25w. Drlg. 3,900 ft.

Pratt County

H. V. Elwell et al No. 1 Fay, NW NW SE sec. 15-27-14w. Whipstock 2,580 ft.; S.D.

Reno County

Atlantic Ref. Co. No. 1 Page, SE NW NW sec. 19-23-7w. R.U.S.T. 3,678 ft.

Foraker et al No. 1 Hiett, SE SW NE sec. 34-24-4w. S.D. 3,930 ft.

Helmerick & Payne No. 1 Benson, NE cor. sec. 5-25-6w. Viola 4,088 ft.; Wilcox 4,130 ft.; Sil. 4,183 ft.; cd. 4,185-95 ft.; sulfur odor.

Helmerich & Payne et al No. 1 Evans, NE NE SE sec. 29-24-6w. Rotary rig.

Imo O. & G. Co. and others No. 1 Watkins, SE cor. sec. 14-22-7w. M.I.M.

Clyde Pulse No. 1 Payne, SW NW NE sec. 4-22-7w. Cong. 3,398 ft.; Chat 3,426 ft.; H.F.W. 3,440 ft., T.D.; P.B. 3,244 ft.; 500 ft. O.I.H.

Olson Drlg. Co. et al No. 1 Herriman, NW cor. sec. 22-24-8w. Rig.

Westgate-Greenland Oil Co. No. 1 O'Sullivan, SW SW NE sec. 24-23-5. Drlg. 2,580 ft.

Rice County

Bradley Oil Co. et al No. 1 Ginter heirs, NW cor. sec. 13-20-8w. Loc.

Buckley No. 1 Bailey, SW SW NW sec. 19-20-6w. S.D. 1,000 ft.

Continental Oil Co. et al No. 1 Michelka, NE NE SW sec. 12-18-8w. Set 7-in. csg. 3,202 ft.; R.U.S.T.

L. E. Douglass No. 1 Coyne, NE SE SE sec. 24-21-8w. S.D. 1,505 ft.

Hanna et al No. 1 Brothers, SE SE NW sec. 25-20-8w. K.C. 2,892 ft.; drlg. 3,110 ft.

John Hanna et al No. 1 Fulton, NW NW NE sec. 24-19-6w. Drlg. 1,535 ft.

T. C. Johnson No. 1 Shubert, SW cor. sec. 9-20-10w. Anhy. 474 ft.; drlg. 2,195 ft.

Manning & Martin et al No. 1 Mathes, SE SW NE sec. 27-21-8w. Cong. 3,323 ft.; cg.

Fred Phillips et al No. 1 Hubenett, SW NW SW sec. 23-20-6w. Spudded.

Roy Ramsey et al No. 1 Malone, NW NW NE sec. 1-20-10w. Drlg. 2,595 ft.

Skelly Oil Co. & Ewers Simpson Oil Corp. No. 1 Linville, SW NW NE sec. 2-20-10w. R.U.R.

C. E. W. Skiles et al No. 1 Helmer, NW NW NE sec. 7-19-8w. M.I.M.

Union Oil & Refining Co. et al No. 1 Baker, SW SW NE sec. 33-20-6w. R.U.

W. E. Witt et al No. 1 Fair, NW SE SE sec. 4-22-8w. Spudded.

Rooks County

Basin Oil Co. No. 1 Baza, NE cor. sec. 23-9-17w. Anhy. 1,437 ft.; drlg. 2,160 ft.

Buckner & Schoff No. 1 McConnel, NE cor. sec. 34-6s-18w. Drlg. 2,943 ft.

Graham et al No. 1 Fike, SW cor. sec. 9-9-17w. T.D. 3,301 ft.

Jones Bros. No. 1 Wiss, NW cor. sec. 8-10-18w. U.R. at 870 ft.

J. H. Lester No. 1 Methene, SE SE NE sec. 29-10-20w. Fsg. 3,422 ft.

Snowden & McSweeney No. 1 Hindman, C E½ NW sec. 35-7s-17w. H.F.W. 3,180 ft., T.D.; P.B. to 3,118 ft.; swbd. 40 B.O. in 24 hrs.; acidized.

Twin Drlg. Co. No. 1 Doughty, SW cor. sec. 15-8-19w. O.W.D.D.; to D.D.

Rush County

S. A. Murphy et al No. 1 Roth, NW NW SW sec. 21-16-18w. Drlg. 895 ft.

Russell County

Empire O. & R. Co. No. 1 Vaughn, SW cor. sec. 17-14-14w. K.C. 3,015 ft.; T.D. 3,031 ft.; 2,000 ft. O.I.H.; flowing.

Equity Gas Co. No. 1 Harbaugh, NW NE SW sec. 19-13-12w. Set 10-in. csg. 780 ft. W.O.C.

Goldstein and Vernon Oil & Gas Co. No. 1 Steinert Estate, NE SE NW sec. 34-15-15w. M.I.M.

S. M. Murphy et al No. 1 Deines, SE SE SW sec. 36-15-15w. B.R.

Shields et al No. 1 Gross, NW NW SE sec. 5-15-13w. Loc.

Saline County

Ryan Consd. No. 1 Wuerth, SW SW NW sec. 28-14-2w. Fsg. 1,870 ft.

Sedgwick County

Cameron et al No. 1 Smith, SW SE SE sec. 13-27-2e. Fsg. 2,782 ft.

Empire O. & R. Co. No. 1 Kimel, NW cor. sec. 4-29-2w. B.R.R.

Roxana Drlg. Co. et al No. 1 Woodman, SW NW SW sec. 26-26-1w. S.D. 611 ft.

E. B. Shawyer No. 1 Furman, SW NE SE sec. 24-29-3w. M.I.M.

E. M. Swearer et al No. 1 Thome, SW SW NW sec. 19-28-1w. Topeka 1,869 ft.; drlg. 2,650 ft.

Stafford County

Empire Ref. Co. et al No. 1 Jordon, SW SW NW sec. 15-25-14w. Simp. 4,210 ft.; Sil. 4,252 ft.; T.D. 4,267 ft.; sulfur wtr.; P.B. acd.; Flowed 140 B.O. in 1½ hrs.

Empire O. & R. Co. No. 1 O'Connor, NE cor. sec. 17-24-15w. Sil. 4,083 ft.; T.D 4,129 ft.; 1,543,000 ft. gas and spraying sulfur wtr.; P.B. 4,108 ft.; W.O.C.

W. P. Faulkner No. 1 Schulz, SE SE NE sec. 6-22-13w. Cellar.

Rose Spring Drlg. Co. et al No. 1 Gray, NW cor. sec. 11-24-13w. M.I.M.

J. E. Trigg and Vernon Oil & Gas Co. No 1 Andrea, SE cor. sec. 4-23-12w. Anhy. 615 ft.; drlg. 2,470 ft.

Sumner County

Graham et al No. 1 Dawson, NW NW NW sec. 4-33-2w. Drlg. 3,990 ft.

Olson Drlg. Co. et al No. 1 Barr, SE cor sec. 8-34-2w. B.R.R.

Orcott & Stewart No. 1 Newton, SE cor sec. 21-30-2. O.W.W.D.; S.D. 930 ft.

E. B. Shawver et al No. 1 Bryan, C W½ W½ SW sec. 36-30-2w. Drlg. 756 ft.

Texas Co. No. 1 Harper, NE SW SE sec. 9-20-3w. Set 15-in. csg. 161 ft.; W.O.C.

C. H. Westfall et al No. 1 Rogers, SW NW SW sec. 35-31-2w. Wilcox 4,247½ ft.; Sil. 4,353-4,400 ft., T.D.

Trego County

Black Gold Oil Co. No. 1 Allman, C SW SW sec. 34-14-21w. Drlg. 3,798 ft.

Woodson County

Harper et al No. 1 Weidle, SE SE NE sec. 10-24-14. Drlg. 1,962 ft.

Resmer No. 1 Corn, NE cor. sec. 31-26-15 Drlg. 1,820 ft.

C. L. Sheedy No. 2 Fulhage, C S½ NW SE sec. 27-25-14. Drlg. 1,435 ft.

Massad & Swansberger No. 1 Barrett, NE cor. SE SE sec. 14-6s-6w. Sd. 1,530-34 ft.; S.O.; cored shale at 1,534-38 ft.; S.D.

Johnston County

Patton et al No. 1 McCrummens, SW SW NE sec. 16-1s-6e. T.D. 1,155 ft.; S.D.

Love County

W. H. Riddle et al No. 1 Johnson, C SW SE cor. sec. 20-8s-2w. T.D. 4,009 ft.; abd.

Sinclair Prairie Oil Co. No. 1 Stockton SE SE SW sec. 26-6s-2w. T.D. 8,583 ft.; P.B. 6,927 ft.; to drill out fish.

Marshall County

Stuart & Taylor No. 1 Chestnut, NE cor. rec. 23-8s-5e. T.D. 803 ft.; S.D.

Murray County

Power Oil Co. et al No. 1 Lancaster Trust. C SW NE sec. 10-1s-2e. T.D. 3,438 ft.; P.B. to 3,175 ft.; W.O.C.

J. Ben Russell No. 1 fee, SE SE NW SE sec. 9-2s-3e. T.D. 1,340 ft.; csg. stuck.

Stephens County

William Angle No. 1 Posey, C NW NW sec. 8-1n-8w. Sd. showing oil, 4,148-51 ft.; Bk. sd., 4,245-50 ft.; showing gas; Granite Wash 4,410-46 ft.; T.D. 4,457 ft.; rebuilt drk., and circulating with oil.

Carter Oil Co. No. 1 Harley, C NE NE sec. 24-2s-4w. Drlg. 3,675 ft.

Jack Cohen No. 1 Pierce, NE NE NW sec 24-2s-6w. T.D. 400 ft.; S.D. for fuel.

Coline Oil Co. No. 1 Johnson, SW SE NE NE sec. 1-2n-8w. T.D. 6,500 ft.; S.D.O.

H. J. Edwards No. 1 Frederick, SW cor NE SE NW sec. 31-2n-8w. T.D. 2,754 ft.; S.L.M.; set csg. 2,716 ft.

Helmerich & Payne No. 1 Graham, SW SW NE sec. 12-1n-5w. T.D. 5,014 ft.; contract depth; Schlumberger test.

B. F. Lundy No. 1 Calmes, NW SW SE sec. 35-1n-4w. Drlg. 1,750 ft.

Ed Parson No. 1 Olson, C SW SW sec. 31-2-8w. Tstd. mud, wtr. and S.O.; sd., odor oil and gas 6,856 ft.; T.D. 7,001 ft.; S.D.

Tillman County

Indian Terr. Ill. Oil Co. No. 1 Hatler, C SW NE sec. 32-2s-17w. T.D. 5,169 ft.; P.B. to 4,525 ft.; P. 78 B.O. and 5 B.W.; comp.

Lynn Oliver No. 1 Rilling, SE SE NW sec. 22-1s-15w. T.D. 1,387 ft.; dry granite wash; S.D.

Shirley Clum et al No. 1 Moricle, NW NW SE sec. 16-4s-14w. T.D. 2,775 ft.; S.D.

OKLAHOMA

Week Ending March 20

NORTHERN OKLAHOMA

Beckham County

Carter Oil Co. No. 1 Garrett, NE cor. sec. 11-7n-25w. Drlg. 1,655 ft.

Mid-American Oil Co. No. 1-A Biscoe, SW cor. sec. 28-8-22w. Drlg. 905 ft.

Caddo County

Clyde Becker et al No. 1 Pharris, SE SE NW sec. 24-6-12w. Bldg. drk.

Cleveland County

W. R. Hollenbeck No. 1 Norman, NW NW NE sec. 17-9-2w. T.D. 300 ft.; reaming.

Coal County

Ruwoldt & Couch No. 1 McMillan, SW cor. sec. 10-1s-8. T.D. 1,343 ft.; lowering csg.

Creek County

J. E. Crosbie, Inc. & Sinclair Prairie Oil Co. No. 1 Bailey, NE NW NW sec. 28-15-7. Drlg. 3,185 ft.

J. W. Mosier et al No. 1 Holcomb, SE SW NW sec. 19-18-8. Fsg. 2,935 ft.

Comoil Oil Co. et al No. 1 Hall, SW SW NE sec. 2-15-7. Layton 1,670-1,705 ft.; drlg. 1,825 ft.

Garfield County

Arab Oil Co. No. 1 Harkendorf, NE cor. sec. 34-20-3w. Drlg. 3,245 ft.

Ohio Oil Co. No. 1 State, SW cor. sec. 13-23-3w. C.&P.

Garvin County

Hayes Drlg. Co. No. 1 Howell, NW SE NW sec. 34-1-1. Rig.

Grady County

Western White Lily Oil Co. No. 1 Stover, SE SW NW sec. 33-3n-7w. T.D. 1,110 ft.; S.D. for pipe.

Haskell County

Continental Oil Co. No. 1 Anderson, SW SE NE sec. 33-8-20. Loc.

Harmon County

Penn State Oil Co. No. 1 Cole, C W½ SW NW sec. 21-2n-26w. Drlg. 80 ft.

Hughes County

W. W. Bussett No. 1 Field, C NW SW sec. 11-9-11. S.D.

Carson Oil Co. No. 1 Lyter, NE NW SW sec. 31-8-12. Drlg. 4,904 ft.

Mid-Western Prod. Co. No. 1 Hill C SE NW sec. 13-9-9. 22,000,000 ft. gas at 2,884 ft.; dry sand, 2,890-2,904 ft.; T.D. 2,942 ft.; S.D.

C. J. Wrightsman No. 1-A Diamond, NE NE SE sec. 33-9-9. Second Crom. 3,360 ft.; T.D. 3,390 ft.; W.O.C.

Kay County

G. A. Brown et al No. 1-A Harris, SW SW NE sec. 14-25-1e. Spudded.

Ritz Oil & Gas Co. No. 1 State, NW NE SW sec. 16-29-2w. Wood. 4,375 ft.; Wilcox 4,425 ft.; odor of oil and salty taste in cores; T.D. 4,449 ft.; D.&A.

Kiowa County

Argus Pet. Co. No. 1 Osborne, NW cor. NE sec. 9-7-16w. T.D. 1,225 ft.; fsg.

Kiowa Oil Corp. No. 1 Finder, C SW NE sec. 4-6-20w. Machine.

McWhirter & Francis No. 1 Padgett, NE NE NW SE sec. 3-5-17w. S.D. 610 ft.

Latimer County

Clark Drlg. Co. et al No. 1 Wilson, C SE SE sec. 15-5-18. T.D. 3,650 ft.; milling cones.

Le Flore County

Lynch et al No. 1 Tidwell, C NW SE sec. 17-3-22. 10-in. 2,246 ft.; T.D. 2,340 ft.; S.D.

Lincoln County

Anderson-Prichard Oil Corp. No. 1 Colon, C N½ SE SW sec. 28-17-4e. Gas gauged 6,800,000 ft.; drlg. 4,385 ft.

Logan County

Anthony & Marshall No. 1 Fruin-Eckman, SE SE SW sec. 4-16-1e. C.O., 4,961 ft.

Harry Blackstock No. 1 Prince, SE NE SW sec. 11-17-3w. Syl. 5,890 ft.; Viola 6,000 ft.; Dense 6,075 ft.; 1st Wilcox 6,156 ft.; 2nd Wilcox 6,230 ft.; drlg. 6,292 ft.

Helmerich & Payne et al No. 1 Ruck, C NE SE sec. 9-19-2w. Drlg. 2,946 ft.

Muskogee County

A. D. Spears et al No. 1 Robbins, NW cor. sec. 20-15-20. Turkey Mt. sd. 1,677-84 ft.; Arbuckle 1,710 ft.; T.D. 1,811 ft.; S.S.O.; S.D.

Noble County

Lincoln Oil Co. et al No. 1-A Neil, NE cor. sec. 15-23-2w. Drlg. 800 ft.

Okfuskee County

Mid-Continent Pet. Corp. No. 1 Gofford, NE NE NW sec. 35-12-7e. Bldg. rig.

Osage County

Norbia Oil Co. No. 1 Osage, NE NE SW sec. 13-23-6. T.D. 760 ft.; fsg.

Pawnee County

Forest Dev. Corp. No. 1 Markham, SW NE SE sec. 10-21-5e. Drlg. 2,440 ft.

Payne County

Bill Riddle No. 1 Van Zandt, NW NW SE sec. 16-18-3e. Cellar and pits.

Pittsburg County

Okla. Dist. Oil Co. No. 1 Beeler, NE NE SW sec. 7-7-14. T.D. 5,165 ft.; S.D. for drill pipe.

Pontotoc County

E. H. Moore et al No. 1 Muse, SW NE SE sec. 33-2n-7. First sd. 4,680 ft.; 2nd sd., 4,734 ft.; McLish 4,780 ft.; drlg. 5,025 ft.

L. K. Sandback et al No. 1 Whittaker, NW NE SE sec. 31-4-6 Cellar.

Pottawatomie County

Champlin Ref. Co. No. 1 Buckler, SE NE NE sec. 7-6-4e. Drlg. 3,110 ft.

Mid-Continent Pet. Corp. No. 1-A Logan, NE NE SE sec. 31-11-5. Drlg. 2,457 ft.

B. H. Rowlett et al No. 1 Burson, SW SW NE sec. 21-9-4e. Loc. abd.

Pushmataha County

Erle Halliburton et al No. 1 Bagwell, SW NE NE sec. 30-3s-15e. T. D. 840 ft.; installing new rotary table.

Seminole County

Amerada Pet. Corp. et al No. 1 Fore A, SW cor. sec. 12-9-7. Wapa. 3,388 ft.; T.D. 3,392 ft.; W.O.C.

J. E. Hall et al No. 1 White, SE NW SE sec. 30-6-8. Gilcrease 2,540 ft.; drlg. 2,600 ft.; S.O.

J. H. Hudson et al No. 1 Tanyan, SE SE SW sec. 32-10-7. Drlg. 2,490 ft.

R. M. Purcell No. 1 Gilliland, SE SE SW sec. 24-11-7. Loc.

Sinclair Prairie Oil Co. No. 1 Rossanna, NW NW SW sec. 28-10-8. T.D. 3,421 ft

Texas County

Cabot Carbon Co. No. 1 Castro, C SE sec. 19-3n-17ecm. T.D. 2,570 ft.; set csg.

Missouri Valley Gas Corp. No. 1 well, C sec. 17-6n-14ecm. Rig.

Washita County

John Koberg No. 1 Harms, NW NW NE sec. 6-10-16w. Drk.

L. P. McWhirter No. 1 fee, SW cor. sec. 34-8-19w. T.D. 1,754 ft. S.D.

SOUTHERN OKLAHOMA

Atoka County

Phelps & Coates et al No. 1 Fidelity Life, SE SW NW sec. 23-1s-12e. T.D. 750 ft.; D.&A.

A. J. Sanders No. 3 Redden, SE SW SW sec. 19-1n-15e. T.D. 1,275 ft. in sand; S.O.; to move in rotary.

Carter County

Helmerich & Payne No. 1 Wolverton, SE NE NW sec. 21-3s-1w. Loc.

Lyle-Wham Dev. Co. No. 1 Jackson, NE SW SW sec. 26-5s-1e. T.D. 881 ft.; S.D.O.

Choctaw County

Cooper & Branstetter No. 1 Bell, C NW NE sec. 29-6s-17. T.D. 1,151 ft. (cor.); S.D.

Comanche County

E. B. Hane No. 1 Duper, NW cor. sec. 21-2n-13w. Drlg. 250 ft.

Frank Scott No. 1-A Kuntz, SE NE SE sec. 21-4-11w. T.D. 2,210 ft.; S.D.

C. V. Morris No. 1 Young, SE NE SE sec. 24-3n-10w. T.D. 822 ft.; S.D.

L. D. Wise No. 1 Cones, SE SE SW sec. 11-1n-10w. T.D. 2,156 ft.; D.&A.

Jefferson County

Buffalo Oil Co. No. 1 Crownover, SE SE NW sec. 21-6s-6w. Drlg. 1,850 ft.

Dodson, Wells-Pierson No. 1 Key, SE SE NW sec. 6-8s-6w. Drlg. 2,406 ft.

Fields et al No. 1 Trout, NE NE SW sec. 5-8s-7w. Drlg. 1,410 ft.

Gulf Oil Corp. No. 1 Woodworth, NW NW NE sec. 20-3s-4w. Loc.

Heenan & Coe et al No. 1 Rose, C SW SW sec. 1-5s-5w. Drk.

ARKANSAS

Dallas County

Walter Louns No. 1 G. Atkinson, NE NW SE sec. 7-10-13. T.D. 2,763 ft.; D.&A.

Grant County

Wallace & Staples No. 1 W. F. Davis, SE SE NW sec. 23-6-15. Jnkd. first hole; T.D. 2,382 ft. Fsg.

Hempstead County

Birdwell et al No. 1 Duckett, SW NW SW sec. 24-13-24. S.D. 125 ft.; M.I.R.

Root Pet. Co. No. 1 Lucey, E. Drake, SE SE NW sec. 24-14s-24w. Rng. to bottom; T.D. 3,278 ft.

Shephert & Todd et al No. 1 Smith, NW SW SE sec. 11-11-25. T.D. 600 ft.; S.D. fuel.

Lafayette County

Carl B. King Drlg. Co. No. 1 Eben H. Woolcott, NE cor. sec. 36-19-26. Drlg. 2,332 ft.

A. M. Neeley No. 1 Meek, NE NE NW sec. 35-19-25. S.D. 3,159 ft.

Little River County

M. E. Sanderson No. 1 Pinning, sec. 6-13-30. S.D. 500 ft.

Joe Strahan No. 1 Dierks, SW SE sec. 21-12-28. Drlg. 2,030 ft.

Miller County

Nivia Oil Corp. No. 1 M.&P. Bank, NE SE SE sec. 18-15-26. R.U.

Miller County—Rodessa

Layton No. 1 Rector, SE cor. 130-ac. tr., sec. 17-20-28. Loc.

McClanahan et al No. 1 W. L. Capps, sec. 11-20-28. Drk.

Nevada County

Benedum & Trees No. 1 Block, NE NE SE sec. 9-14-20. Cg. L. 5,065 ft.

Benedum & Trees No. 2 C. C. Fincher, SW SW NE sec. 10-14-20. T.D. 1,260 ft.; W.O.S.R.

Benedum & Trees No. 3 C. C. Fincher, sec. 10-14-20. Comp.; pmp. 518 bbls. 20 hrs.; T.D. 2,160 ft.

Benedum & Trees No. 4 C. C. Fincher, SE SW NE sec. 10-14-20.

Benedum & Trees No. 4 Grove, SE SW NW sec. 10-14-20. Drk.

Benedum & Trees No. 7 Grove, NW SW NW sec. 10-14-20. P.B. to T.D. 1,283 ft.; W.O.C.S.

Benedum & Trees No. 8 Grove, SW SW NW sec. 10-14-20. T.D. 2,173 ft.; W.O.S.R.

Benedum & Trees No. 9 Grove, NE NW SW sec. 10-14-20. R.U.; W.O.

Benedum & Trees No. 1 Mary Jackson, NE NW NE sec. 9-14-20. T.D. 2,134 ft.; W.O.S.R.

Benedum & Trees No. 2 Mary Jackson, SE NE NE sec. 9-14-20. M.I.R.

Benedum & Trees No. 1 A. R. Mitchell, SE SW SE sec. 4-14-20. R.U.

Berry Asphalt No. 1 W. Haynie, NE NE NW sec. 6-14-20. 7-in. 1,191 ft.; T.D. 1,193 ft.; W.O.C.S.

Berry Asphalt Co. No. 2 J. Haynie, NE SE SW sec. 6-14-20. Loc.

J. C. Buckbee No. 1 Wortham, SW SW NW sec. 29-13-21. T.D. 2,340 ft.; T A Hall & Briscoe No. 5 Ritchie, 100 ft. N No. 2, sec. 10-14s-20w. Drk.

A. M. Lacy No. 1 H. C. Bennett, SW SE sec. 24-14s-22w. Drk.

John R. Lewis No. 1 W. Haynie, SW SW NE sec. 5-14-20. Cg. 2,112 ft.

Walter Lowd No. 1 T. S. Grayson, SW SW SE sec. 12-14-20. T.D. 1,765 ft.; S.D.

W. E. Stewart No. 1 Mendenhall, cen. SE NW NE sec. 1-14-20. Wsg. to bottom 400 ft.

Steel & Warmack No. 1 Wm. Haynil, SE SE NW sec. 6-14-21. T.D. 1,183 ft.; W. O.S.R.

G. H. Vaughn No. 1 Christopher, SW SW SE sec. 3-14-20. Drlg. 1,625 ft.

Ouachita County

J. D. Reynolds No. 2 P. C. Grayson, Lot 4, Blk. 10, Stephens Sur., sec. 21-18-19. Bailing; T.D. 1,508 ft.

Pope County

Arkansas-La. No. 1 Smith, sec. 10-8n-21w. D.&A. 4,790 ft.

Saline County

Duncan & Gibbens No. 1 Williams, NW NE NE sec. 18-3-15. 10-in. cmtd. 104 ft.

Sevier County

C. J. Benkley No. 1 Luther Tabler, NW NE SE sec. 14-10s-29w. R.U.

Union County

Dietrich et al No. 1 Aaronson, NE SW NE sec. 3-18-16. R.U. and W.O.

Lion Oil No. 1 Morgan, sec. 18-18-17. O.W. D.D. (formerly Phillips Pet. Co.); D.S.T. shows flow oil; tstg.; T.D. 5,566 ft.

Fenn-Ark. Corp No. 1 W. N. Raulston, 330 ft. S and E, NW NW SE sec. 12-17-14. Tstg.; T.D. 2,983 ft.

S. H. A. Oil Corp. No. 1 H. D. Warren, NE SW SW sec. 10-17-14. Drlg. out cmt. 3,342 ft. and W.O.S.R.; T.D. 3,342 ft.

LOUISIANA

NORTH LOUISIANA PROVEN

Caddo-Rodessa

Gulf Oil No. 1 Campbell, C sec. 4-23-16. Drlg. 150 ft.

J. Edw. Jones No 2-B Sharp, NW C sec. 4-23-16. R.U.

J. Edw. Jones No. 4-A Sharp, SE C sec. 4-23-16. R.U.

Lion Oil Rfg. No. 1 Holm, NW SE SE sec. 9-23-15. 10-in. cmtd. 2,137 ft.

Lyons & Neely No. 1 Noel, SE cor. sec. 8-23-15. Swb. S.W. only; S.D.; T.D. 6,086 ft.

Lyons & Neely No. 2 Noel, SW SE SE sec. 8-23-15. S.D. 5,670 ft.

Magnolia Pet. Co. No. 11-A Caddo Lvy. Bd., SW cor. sec. 21-23-16. T.D. 5,920 ft.; D.S. stk.; fsg.

R. W. Norton No. 1 L. C. Harden, NE sec. 20-23-16. Rng. 7-in. 5,980 ft.

R. W. Norton No. 2 L. C. Harden, 585 ft. E, 656 ft. N, SW cor. 56-ac. tr., sec. 20-23-16. Loc.

R. W. Norton No. 1 Payne, C SE SE sec. 27-23-16. Cg. 5,870 ft.

R. W. Norton No. 4 Starke, 1,980 ft. N, 660 ft. E, SW sec. 16-23-16. R.U.

Standard Oil of La. No. 1 Armistead Comm., SW SW SE sec. 4-23-16. 7-in. cmtd. 5,927 ft.; T.D. 6,025 ft.; W.O.C.S.

Standard Oil of La. No. 2 Armistead Comm., SE SE SW sec. 4-23-16. 7-in. cmtd. 5,941 ft.; T.D. 6,039 ft.; W.O.C.S.

Standard Oil No. 2 J. R. Harden, NE NW NE sec. 16-23-16. Comp.; flw. 390 B.P.D.; T.D. 5,988 ft.

Standard No. 1 W. M. Terry, SE NE SW sec. 9-23-16. R.U.

United Gas No. 6 fee 574, SW NE NW sec. 16-23-16. Loc.

United Gas No. 1-A Mitchell, 656 ft. N and W, SE cor. sec. 17-23-16. Comp.; flw 24 B.P.H.; T.D. 5,910 ft.

United Gas Co. No. 4 W. M. Mitchell, NW cor. sec. 20-23-16. Comp.; flw. 21 B.P.H.; T.D. 5,935 ft.

United Gas Co. No. 27 Rodessa O. & L. Co., NE NW sec. 15-23-16. Fsg. 5,993 ft.

United Gas No. 5 Young, NW sec. 27-23-16. Drlg. 4,908 ft.

N. LOUISIANA WILDCATS

Bienville Parish

DeSoto O. & G. Co. No. 1 Ashley, SW SE sec. 15-16-10w. Loc.

Lide & Greer No. 1 Smelley, 220 ft. N, 160

ft. W.' SE SW NE sec. 13-16-5. 25,000,000 ft. gas at 7,202 ft.; T.D. 7,693 ft.; tstg.

Lide & Greer No. 1 W. J. Smelley, SE NW SW sec. 18-16-4w. Loc.

McDowell et al No. 1 Locke, NE cor. sec. 9-15-10. Drlg. 2,465 ft.

Seaboard No. 1 McGee, 660 ft. N and C sec. 3-16-3. Comp.; 67,000,000 ft. gas; T.D. 7,299 ft.; P.B. 8,017 ft.

Bossier Parish

Arkansas-La. No. 1 R. Hardeman, cor. sec. 6-17-11. 7-in. 4,314 ft.; T.D. 4,324 ft.; W.O.C.S.

Arkansas-La. No. 1 Tom Wilson, SW 8-17-11. Drlg. 2,700 ft.

La. Pet. Corp. et al No. 1 Edwards NW SW sec. 5-17-11. Comp.; est. 40,000,000 ft. gas; T.D. 5,187 ft.

Haynes Drlg. Co. No. 1 A. J. Murff, SE sec. 35-17-12. Drlg. 4,819 ft.

Producers O. & G. No. 1 R. Johnson, NE sec. 5-17-11. Drlg.

Tidwell et al No. 1 Natting, sec. 15-23- T.D. 2,954 ft.; S.D.

Triangle Drlg. Co. No. 1-I Skannal, cor. sec. 22-17-12. Acid and flwg. 60 B.P. D.; tstg.; T.D. 5,170 ft.

Triangle No. 2 Ross Unit, NW SW NW sec. 23-17-12. Drlg. 3,700 ft.

Triangle No. 1-H Skannal, SE SW sec. 23-17-12. 7-in. cmtd. 5,159 ft.; T.D. 5,166 ft.

United Gas No. 1 Henderson, NE cor sec. 36-17-12. Drlg. 4,890 ft.

United Gas No. 1-H A. C. Skannal, SE sec. 26-17-12. T.D. 5,144 ft.; acidizing; W.O.

United Gas No. 1-I Skannal, SW SW sec. 23-17-12. Drlg. 1,223 ft.

United No. 1-A Webb, C sec. 23-17-12. 13-in. cmtd. 298 ft.

Caddo Parish

Bayou State Oil No. 10-B Jolly, SE NE NE sec. 21-22-15. T.D. 1,017 ft.; D.&A.

E. L. Butt and Sam Hill No. 1 Caddo Lvy. Bd., C sec. 8-20-16. Drlg. 300 ft.

W. D. Chew No. 3 Rives, NE sec. 5-20-16. Drlg. 450 ft.

W. D. Chew No. 4 U. S. Govn., NW sec. 5-20-16. Drlg.

Paul Cooper No. 1 Rodgers, NW SW SW sec. 11-20-15. Comp.; P. 12 B.P.D.; T.D. 2,215 ft.

C. C. Chews No. 3 Pender. SW NW SW sec. 11-20-15. Cmtd. 6-in. 2,363 ft.; W.O. C.S.

Custer Oil Co. No. 1 Wemple, N½ NW sec. 14-20-15. S.D. 1,650 ft.; rig rep.

D. K. O. Oil Corp. No. 1 Tyson, SE NE sec. 17-21-15. 10-in. cmtd. 100 ft.

DeMaggo et al No. 1 Huckaby, SE NE SE sec. 26-22-16. Drlg. 1,600 ft.

Gulf Ref. Co. No. 1 E. P. Hatcher, 660 ft. N and E, SW cor. SE¼ sec. 11-17 15. Drlg. 9,051 ft.

W. J. Hunter et al No. 1 Stoer, NW SW NE sec. 10-15-15. Loc.

Juan et al No. 1 Clara Hobbs, SW NW NW sec. 28-21-15. T.D. 1,780 ft.; D.&A.

B F. Laney No. 1 Taylor. SW SE SW sec. 17-21-14. T.D. 912 ft.; D.&A.

F. L. Luckett No. 1 Connell. SW NE sec 10-20-15. 6-in. cmtd. 2,174 ft.; T.D. 2,207 ft.; blg. to test.

Prairie River Synd. No. 1 Hutchinson, SW NW sec. 15-15-12. R.U. to D.D.; old T.D. 7,377 ft.; wsg. to bottom to D.D.

Robson Oil Properties, Inc., No. 1 Cupples NE sec. 24-16-13 (formerly Falcon Oil Co.). Drlg. 4,275 ft.

Rodgers et al No. 1 Thompson, NW SW SW sec. 11-20-15. Swb. S.W. 2,211 ft.

P. A. Singlust No. 2 Starr-Brown, SE sec. 28-20-16. Drlg. 1,815 ft.

Stanolind O. & G. No. 118 Dillon, SE sec. 14-21-15. 7-in. cmtd. 1,413 ft.; W.O.C.S.

Stanolind O. & G. No. 119 Dillon, SE NE sec. 14-21-15. R.U.

Stanolind O. & G. Co. No. 121 Dillon, NE SE sec. 14-21-15. Loc.

Stanolind O. & G. Co. No. 122 Dillon, NW sec. 13-21-15. Loc.

J. J. Thompson No. 1 Gamm, NE SW NW sec. 35-21-15. Tstg. S.W.; S.D.; T.D. 2,225 ft.

Claiborne Parish

Lisbon Oil Co. No. 1 J. W. Burgess, NE SE NE sec. 3-20-5w. Cg. 5,129 ft.

Lyons & Neely No. 1 H. E. Patton, NE NW SW sec. 36-21-5w. Drlg. 4,834 ft.

Ray P. Oden No. 1 W. H. Patton, SW SE SE sec. 36-21-5w. Drlg. 5,325 ft.

Red Iron Drlg. Co. No. 1 H. E Patton, S½ SW NE sec. 36-21-5w. Drlg. 5,080 ft.

Shreveport Oil Corp. No. 1 Edwards, NE sec. 16-20-5w. Loc.

Standard Oil of La. No. 1 Baker, 660 S&E NW sec. 27-19n-7w. Cg. 4,464 ft.

United Gas et al No. 1 W. Brown, sec. 1-19-6. T.D. 5,943 ft.; tstg.

De Soto Parish

Benedum & Trees No. 1 Clifton, NE NW sec. 33-13-12. Drlg. 3,404 ft.

Chamberlin et al No. 1 Lanier, 280 ft. N and E, SW NE sec. 29-11-11. R.U.

Gulf Ref. Co. No. 36-A Jenkins, SE cor. sec. 2-12-12. Tstg.; T.D. 2,441 ft.

Lee Oil Co. No. 1 Mansfield, SE sec. 13-10-14. Drlg.

Peral Oil Co. No. 1 Joyner, SE NW SW sec. 28-11-12. Rmg. 3,000 ft.

Rio Rajo Oil Co. No. 7 Prudhomme, SE cor. sec. 20-12-11. T.D. 2,704 ft.; will set csg.

Stillers et al No. 2 Jenkins, 330 ft. S and W. NE SE NW sec. 35-13-12. S.D. 2,503 ft.; fuel.

R. M. Sundby No. 1 A. P. Garland, NW SW sec. 7-14-14. Drlg. 4,600 ft.

Grant Parish

Grantland Prod. Co. No. 1 Swope-Labrat, NE SW sec. 8-9-1e. Loc.

Tri State Lse. & Dev. Co. No. 1 Eden-born Est., NE SE SE sec. 13-7-4w. T.D. 3,000 ft.; S.D.

Jackson Parish

G. W. Zeigen No. 5 La. Cen. Lbr. Co., sec. 13-14-2w. Drlg. 1,950 ft.

LaSalle Parish

Lee Oil Corp. No. 1 Tullos, 150 ft. S and W NE NE sec. 26-10-1e. Comp.; pmp. 5 B.P. D.; T.D. 1,529 ft.

Lee Oil Corp. No. 2 Tullos, NE cor. sec. 26-10-1e. T.D. 1,534 ft.; D.&A.

Urania O. & G. Co. No. 1 Urania, NW sec. 7-10-2. T.D. 1,403 ft.; prep. set csg.

Morehouse Parish

So. Carbon Co. No. 3 Miles, NE sec. 36-21-4e. 8-in. cmtd. 770 ft.

Natchitoches Parish

Natchitoches Oil Co. No. 1 Simpson, sec. 12-7-7 (formerly reported in error as abd.). Now reblдg. drk.

Ouachita Parish

H. L. Woods No. 1 Union, NE sec. 17-19-3e. R.U.

H. L. Woods No. 2 Union Power, SE sec. 17-19-3e. Loc.

United Gas No. 2 Morris, SE sec. 36-19-3e. Loc.

United Carbon No. 7 Neston, NE cor. sec 32-19-4e. Cmt. 6-in. 2,187 ft.; W.O.C.S.

Red River Parish

Gulf No. 39 E. T. Robinson, NW cor. sec. 25-13-11. 6-in. cmtd. 2,490 ft.

...n Oil Co. No. 1 DeLong, 330 ft. S and E. C sec. 23-12-10. Fsg. 2,800 ft.

Richland Parish

Gulf Ref. Co. No. 15 R. R. Rhymes et al. sec. 32-17-6e. Drlg. 9,815 ft.

Sabine Parish

Earl F. Fox No. 1 Blankenship, NE SW NW sec. 13-9-12. S.D. sh.; T.D. 3,412 ft.

Kirk-Green-Way Inc. No. 1 Whitney Corp., NW NE sec. 8-9-13. Drlg. 2,240 ft.

Power Oil Co. No. 1 Belton, 990 W. 330 S NE sec. 31-9-13w. Comp.; pmp. 30 B.P.D.; T.D. 1,709 ft.

Prod. O. & G. Co. No. 1 Edwards Est., SE NW SW sec. 29-9-13. T.D. 1,743 ft.; acid; W.O.

Prod. O. & G. Co. No. 1 Lynch, SW NE SW sec. 29-9-13. Pumped off; acid.; T.D. 1,608 ft.

Willis & Dowden No. 1 Lynch, SW NE SW sec. 29-9-13. T.D. 1,608 ft.; arg. tst.

Union Parish

Interstate Natl. Gas Co. No. 63 fee, SE sec. 3-21-3e. 8-in. cmtd. 786 ft.

So. Carbon Co. No. 17 Grayling, SW cor. **sec. 21-21-4e. R.U.**

So. Carbon No. 18 Grayling, SE cor. **sec 20-21-4e. Loc.**

W. L. Woods No. 2-B Frost Lbr., NW sec. 16-21-3e. Loc.

H. L. Woods No. 3-B Frost Lbr. Co., SE SW sec. 10-21-3e. Loc.

Webster Parish

W. H. Bass Drlg. Co. No. 1 T. Crichton, C NW NW sec. 21-20-9. Loc.

Magnolia No. 2 D. G. Cox, SW SE NE sec. 22-21-10. R.U.

Ohio Oil Co. No. 1 S. P. D. Coyle, NW SE SW sec. 23-21-10. 9-in. 5,541 ft.; T.D. 5,570 ft.; W.O.C.S.

Ohio Oil Co. No. 2 R. M. Coyle, SE sec. 22-21-10. Drlg. 3,846 ft.

Ohio No. 1 S. P. D. Coyle and W. Cox, SW SW SE sec. 23-21-10. Loc.

Ohio Oil Co. No. 2 A. H. Gray Acct. No. 2, NW sec. 26-21-10. Drlg. L. 5,570 ft.

Ohio Oil Co. No. 2 A. J. Hodges, NE NW SW sec. 23-21-10. Drlg. 6,000 ft.

Ohio No. 7-B R. L. Holloway, 586 ft. N, 756 ft. E line, sec. 23-21-10. Loc.

L. R. Skidmore No. 1 Barnett, NE NW SW sec. 29-17-9. Drlg. 2,710 ft.

Standard Oil Co. of La. No. 1 E. Firdeckier, 1,320 ft. E. 1,316 ft. S. NW cor. sec. 2-17n-9w. T.D. 7,202 ft.; fsg. for cone.

United Gas No. 2 Davis, 660 ft. S and E NW cor. sec. 23-21-10. Tstg. gas; T.D. 8,551 ft.

United Gas No. 1 Mixon, SE SW sec. 22-21-10. T.D. 8,231 ft.; W.O.

Woodley Pet. Co. No. 4-B Gray, NE NE sec. 27-21-10. Drlg. 5,851 ft.

SOUTH LOUISIANA FIELDS

Ansela Butte—St. Martin Parish

Stanolind O. & G. Co. No. 1 Patin, sec. 46-9s-5e. 13⅜-in. csg. 1,514 ft.; T.D. 5,430 ft. (cor.); P.B. 2,658 ft.; T.D. 6,147 ft.; D.S. stuck; fsg.

Bayou Cocotrix—Terrebonne Parish

Shell Pet. Corp. No. 1 Pelican, sec. 35-17s-15e. Driving piling; bldg. road.

Bayou Mallett—Acadia Parish

Superior Oil Prod. Co. No. 5 Breelley, sec. 52-7s-1e. Drlg. sh. 7,204 ft.

Black Bayou—Cameron Parish

Shell Pet. Corp. No. 37 Watkins, sec. 8-12s-12w. R.U.

Caillou Island—Terrebonne Parish

Texas Co. No. 40 State, sec. 78-23s-20e. T.D. 4,916 ft.; 7⅝-in. csg. 4,863 ft.

Cankton—St. Landry Parish

Superior Oil Prod. Co. No. 1 Brasseaux, sec 24-8s-3w. Drlg. sd. and sh. 5,161 ft.

Charenton—St. Mary Parish

Pan American Prod. Co. No. 3 Laws Realty Co., sec. 25-13s-9e. Sd. and sh. 4,850 ft.

Pan American Prod. Co. No. 1 South Coast Corp., sec. 30-13s-10e. S.D. 6,934 ft.; high wtr.

Choctaw—Iberville Parish

Standard Oil Co. No. 9 Myrtle Grove, sec. 53-9s-11e. T.D. 3,455 ft.; P.B. 3,160 ft.; to sdtrk.; drlg. sh. 4,209 ft.

Cameron Meadows—Cameron Parish

Burton Sutton Oil Co. No. 16 Sch. Ld. sec. 16-14s-13w. Set 10¾-in. csg.; T.D. 4,851 ft.; P.B. 3,650 ft.; drlg. sh. 3,742 ft.

Burton Sutton Oil Co. No. 18 School Ld., sec. 16-14s-13w. Drk.

Magnolia Pet. Co. No. 19 Cameron Meadows sec. 16-14s-13w. T.D. 4,714 ft.; recvd. 2,500 ft. of P.L.O. on D.S.T.; 9⅝-in. csg 4,694 ft.; P.B. 4,708 ft.; blew out, caught fire; bridged; R.U.; 7-in. csg. 4,696 ft.

Darrow—Ascension Parish

Humble O. & R. Co. No. 4 Community, sec. 33-2e. Drlg. sh. 7,400 ft.

Dog Lake—Terrebonne Parish

Texas Co. No. 4 State, sec. 5-22s-16e. T.D. 5,342 ft.; sdtrkd. at 5,185 ft.; T.D. 6,147 ft.; P.B. and sdtrkd.; drlg. sh. 6,891 ft.

Four Isle—Terre Bonne Parish

Texas Co. No. 8 State. Drlg. sd. and sh. 9,385 ft.

Garden Island—Plaquemines Parish

Texas Co. No. 23 State, sec. 37-23s-33e. 18⅝-in. csg. 541 ft.; top salt 5,933 ft.; T.D. 5,965 ft.; P.B. and sdtrkd.; drlg. sh. 3,990 ft.

Gillis—Calcasieu Parish

Fohs Oil Co. No. 1 First Natl. Bank, sec. 13-9s-8w. R.U.

Texas Co. No. 12 Nickerson, sec. 1-9s-8w Drlg. sh. 4,031 ft.

Union Sulphur Co. No. 12 Barbe, sec. 1-9s 8w. T.D. 9,101 ft.; blew out; caught fire; cratered; cleaning up after blowout; S.D.

Union Sulphur Co. No. 13 Barbe, sec. 1-9s-8w. T.D. 6,735 ft.; oil sd.; I.P. 320 B.P.D. 21/64-in. ck.

Union Sulphur Co. No. 14 Barbe, sec. 1-9s-8w. Drlg. sh. 296 ft.

Union Sulphur Co. No. 7 Castle, sec. 14-9s-8w. Drlg. sh. 3,259 ft.

Union Sulphur Co. No. 4 Kaufman, sec. 12-9s-8w. Loc.

Union Sulphur Co. No. 12 Powell Lbr. Co., sec. 12-9s-8w. R.U.

Hackberry—Cameron Parish

W. T. Burton No. 1 Kennedy, sec. 22-12s-10w. Drk.

W. T. Burton No. 1 Rosella Vincent, sec. 22-12s-10w. T.D. 4,351 ft.; 7-in. csg. 4,297 ft.

Gulf Oil Corp. No. 23 Erwin, sec. 12-12s-10w. Drlg. sh. 737 ft.

Independent Oil Co. No. 1 Sanner, sec. 29-12s-10w. T.D. 1,775 ft.; 5-in. csg. 1,775 ft.; swbd. S.W.

Stanolind O. & G. Co. No. 6 Carter, sec. 22-12s-10w. T.D. 4,225 ft.; 7-in. csg. 4,205 ft.

Stanolind Oil & Gas Co. No. 1 J. H. Duhon, sec. 27-12s-10w. Drlg. sdy. sh. 4,609 ft.

Stanolind O. & G. Co. No. 25-B Gulf Land fee, sec. 15-12s-10w. 20-in. csg. 158 ft.; W.O.C.

Stanolind O. & G. Co. No. 1 Little, sec. 28-12s-10w. R.U.

Stanolind O. & G. Co. No. 1 M. J. Muller, sec. 23-12s-10w. 7⅝-in. csg. 4,617 ft.; abd. 5,812 ft.

Stanolind O. & G. Co. No. 18 School Land, sec. 16-12s-10w. Drlg. sh. 5,940 ft.

Sutton Joint Interest No. 1 Ellender, sec. 22-12s-10w. Drlg. sh. 4,080 ft.

Texas Co. No. 20 State, sec. 12-12s-10w T.D. 7,989 ft.; perf. csg. 7,626-45 ft.; tstg.; I.P. 750 B.P.D.; ¼-in. ck.

Iowa—Jefferson-Davis Parish

Shell Pet. Corp. No. 22 Heyd, sec. 13-9s-7w. T.D. 4,432 ft.; 7-in. csg. 4,408 ft.; W.O.C.

Jeanerette—St. Mary Parish

Herton Oil Co. No. 2 Barrilleaux, sec. 59-13s-8e. Drlg. sh. 5,099 ft.

Herton Oil Co. No. 5 Carter, sec. 38-13s-9e. 10¾-in. csg. 1,495 ft.; drlg. sh. 7,039 ft.

Teche Oil Co. No. 1 LeBourgeois, sec. 59-13s-8e. 10-in. csg. 1,400 ft.; W.O.C.

Jennings—Acadia Parish

W. T. Burton No. 1 Robira, sec. 41-9s-2w. Bldg. road.

A. C. Glassell et al No. 1 J. Trusel, sec. 42-9s-2w. Drlg. sh. 6,125 ft.

Lake City Oil Co. No. 2 Jennings Synd., sec. 46-9s-2w. T.D. 3,990 ft.; P.B. and sdtrkd.; D.S. stuck 3,939 ft.

T. C. Markly No. 1 Gourney, sec. 42-9s-2w. Old T.D. 4,280 ft.; skidded drk.; drlg. 1,044 ft.

Shell Pet. Corp. No. 2 Community, sec 40-9s-2w. T.D. 7,185 ft.; 7-in. csg. 7,181 ft.; cg. 7,509 ft.

Stanolind O. & G. Co. No. 18 Houssiere Latrielle, sec. 47-9s-2w. 8⅝-in. csg. 5,358 ft.; sd. 5,589 ft.; no report.

Superior Oil Prod. Co. No. 2 Eunice-Crowley, sec. 12-9s-2w. Drk.

Superior Oil Prod. Co. No. 2 Jennings-Heywood, sec. 41-9s-2w. 11¾-in. csg. 1,465 ft.; W.O.C.

Superior Oil Prod. Co. No. 2 Leckcit, sec. 42-9s-2w. 7-in. csg. 7,041 ft.; W.O.C.

Lafitte—Jefferson Parish

Texas Co. No. 6 Lafitte, sec. 20-17s-24e T.D. 1,771 ft.; lost returns; moved drlg. barge 135 ft. N of first hole; drlg. sdy. sh. 8,619 ft.

Texas Co. No. 6 Rigolettes, sec. 39-17s-24e T.D. 9,479 ft.; 7-in. csg. 9,440 ft.

Texas Co. No. 1 State-Bayou Norman, sec. 28-17s-24e. Dredging canal.

Lake Barre—Terrebonne Parish

Texas Co. No. 37 Lake Barre-State. Drlg. sh. and L. 10,934 ft.

Lake Hermitage—Plaquemines Parish

Gulf Oil Corp. No. 6 LaFourche, sec. 11-8s-25e. Drlg. sd. 6,315 ft.

Leesville—Lafourche Parish

Gulf Oil Corp. No. 1-A City of New Orleans, sec. 35-21s-22e. T.D. 5,831 ft.; hole cleaned; run Schlumberger.

Texas Co. No. 59 L.L.&E., sec. 27-21s-27e. Drlg. sd. 3,769 ft.

Texas Co. No. 62 Leesville, sec. 29-17s-24e. T.D. 4,015 ft.; 7⅝-in. csg. 4,008 ft.

Lockport—Cameron Parish

Magnolia Pet. Co. No. 6 Freeberg, sec. 9-10s-9w. Drk.

New Iberia—Iberia Parish

Wm. Hellis No. 7 Bernard, sec. 54-12s-7e. Drlg. sh. 4,449 ft.

Wm. Hellis No. 4 Boliver, sec. 56-12s-7e Drlg. 1,637 ft.; no report.

Wm. Hellis No. 4 Bullock & Burke, sec. 25-12s-7e. T.D. 4,505 ft.; P.B. and sdtrk.; T.D. 4,401 ft.; P.B. and sdtrkd.; T.D. 4,548 ft.; 7-in. csg. 3,722 ft.; completing.

Wm. Hellis No. 3 Schwing, sec. 57-12s-7e Drlg. sh. 1,520 ft.

Texas Co. No. 3 Bryant, sec. 25-12s-7e. Bldg. road.

Texas Co. No. 1 Dohoe, sec. 26-12s-7e. Sd. 4,710-94 ft.; 7-in. csg. 4,710 ft.

Texas Co. No. 5-B Hanzen, sec. 54-12s-7e. Drk.

Sorrento—Ascension Parish

Pan American Prod. Co. No. 8 United Land, sec. 22-10s-4e. T.D. 5,980 ft.; rmg.

Sorrento Oil Co. No. 1 Bernard, sec. 9-19s-14e. S.D. 6,262 ft.

Tri-State Dev. Co. No. 1 Duplessis, sec. 69-10s-2e. Drk.

Starks—Calcasieu Parish

J. R. Turnbull No. 1 Industrial Lbr. Co sec. 20-9s-12w. S.D. 6,433 ft.

St. Martinsville—St. Martin Parish

Tide Water Oil Co. No. 3 Smedes, sec. 57-11s-6e. Bldg. road.

Sulphur—Calcasieu Parish

Union Sulphur Co No. 840 fee, sec. 18-9s-10w. Sh. and L. 3,477 ft.; no report.

Union Sulphur Co. No. 842 fee, sec. 29-9s-10w. T.D. 5,475 ft.; P.B. and sdtrkd.; drlg. sh. 2,930 ft.

Tepetate—Acadia Parish

Continental Oil Co. No. 9-A Homeseekers Dev. Co., sec. 29-7s-2w. T.D. 8,323 ft.; P.B. to sdtrk. at 2,354 ft.; drlg. sh. 7,929 ft.

Continental Oil Co. No. 3 Johnson, sec. 30-7s-2w. 5⅝-in. csg. 8,323 ft.; W.O.C.

Continental Oil Co. No. 4 P. W. Miller, sec. 28-7s-2w. Drk.

Continental Oil Co. No. 1 M. F. Ortego, sec. 30-7s-2w. 5⅝-in. csg. 8,323 ft.; W.O.C.

Valentine—Lafourche Parish

Pan American Prod. Co. No. 2-A Harang, sec. 9-17s-20e. Spudded.

Pan American Prod. Co. No. 3 Harang, sec. 8-17s-20e. Cg. 6,939 ft.

Pan American Prod. Co. No. 4 Harang, sec. 8-17s-20e. 16-in. csg. 210 ft.

White Castle—Calcasieu Parish

Shell Pet. Corp. No. 4 Shingle, sec. 12-11s-12e. T.D. 8,903 ft.; P.B. 8,717 ft.; drill pipe stuck; fsg.

S. LOUISIANA WILDCATS

Acadia Parish

H. E. Dalton No. 1 Setting, sec. 17-7s-1w Drlg. sh. 4,606 ft.

Humble O. & R. Co. No. 1 Nordyke, sec 23. 9⅝-in. csg. 6,843 ft.; cg. sh. 9,071 ft.

Allen Parish

Humble O. & R. Co. No. 3 Bel, located in cratered hole, sec. 26-6s-7w. 10¾-in. csg. 165 ft.; T.D. 2,870 ft.; 7-in. csg. 2,756 ft.; shot well; failed to stop flwg. S.W.; S.D.

Avoyelles Parish

Coastal Mineral Dev., Inc., No. 1 Purdy-Hess, sec. 25-2n-3e. Drk. abd.

George Conover No. 1 Purdy-Hess, sec. 36-2n-3e. Drk.

Frost Oil Co. No. 1 Hines Lumber Co. sec. 3-3n-4e. Drk.

Calcasieu Parish

D. D. Oil Co. No. 1 Lutcher Moore, sec 11-8s-13w. T.D. 8,398 ft.; tried to blow out; D.S. stuck.

Cameron Parish

Magnolia Pet. Co. No. 1-A Dobbertine, sec. 9-15s-14w. R.U.

ure Oil Co. No. 1 Mallard Bay, sec. 39-13s-3w. 18⅝-in. csg. 1,499 ft.; 9⅝-in. csg. 7,906 ft.; T.D. 10,146 ft.; drill stem stuck; P.B. 6,923 ft.; perf. csg. 5,763-68 ft.; making D.S.T.

...thern Sulphur Co. No. 2 State, sec. 29-15s-10w. Drlg. sh. 1,600 ft.

Union Sulphur Co. No. 1 J. O. Hebert. sec. 18-12s-8w. T.D. 6,746 ft.; P.B. 6,484 ft.; to sdtrk.

East Baton Rouge Parish

Cavalier Oil Co. No. 1 Vingnes, sec. 48-8s-2e. T.D. 6,690 ft.; D.S. stuck.

Evangeline Parish

Belle Chenney Springs Oil Co. No. 1 Belle Springs Land Dev. Co., sec. 10-2s-1w. S.D. 1,723 ft.

Continental Oil Co. No. 1 Pardee Lbr. Co., sec. 18-4s-1w. Cg. sd. 5,119 ft.

East Feliciana Parish

Barnett Pet. Corp. No. 1 Tullis, sec. 34-2s-1w. Abd. 6,508 ft.

East Feliciana Oil No. 1 West & Budding, sec. 37-1s-1w. Spudded 15 ft. and S.D.

Iberia Parish

Jefferson Lake Oil Co. No. 414 State Lake Pigneur, Twp. 12s-5e. Top salt 990 ft.;

set 10¾-in. csg. 5,695 ft.; top oil sd. 6,915 ft.; 7-in. csg. 6,930 ft.; perf. csg. 6,930-40 ft.; flwd. 10 bbls. of fluid per hr.; some S.W.; made squeeze job; drlg. out cmt.; prep. to test.

Jefferson Parish

Louisiana Crusader Oil Corp. No. 1 Langley, sec. 36-7s-5w. Bldg. road.

Triangle Oil Co. No. 1 Conroe, sec. 13 12s-11e. T.D. 2,461 ft.; drill stem stuck

Jefferson Davis Parish

Shell Pet. Corp. No. 1 Joe Sturdivant sec. 25-10s-4w. 10¾-in. csg. 2,616 ft 7-in. csg. 8,630 ft.; drlg. 9,043 ft.

Stanolind O. & G. Co. No. 1 Calcasieu Natl. Bank, sec. 28-7s-3w. T.D. 9,139 ft.; blew out, hole bridged; cutting and pulling stuck D.S.

Stanolind O. & G. Co. No. 1 United Life Accident Co., sec. 16-11s-5w. 13⅜-in. csg. 2,142 ft.; drlg. sh. 4,190 ft.

Lafourche Parish

Fohs Oil Co. No. 1 State Lake, sec. 85 17s-19e. 26-in. csg. 20 ft.; 13⅜-in. csg. 2,730 ft.

Wm. Helis No. 1 City of New Orleans sec. 19-23s-23e. Drlg. sd. 6,793 ft.

Livingston Parish

Coastline Oil Co. No. 1 Addison Trust Co sec. 7-7s-3e. Drlg.

Plaquemines Parish

Gulf Oil Corp. No. 1 Bay-Adams, sec. 35-32s-19. Drlg. sd. 3,963 ft.

Tide Water Oil Co. No. 2 Manhattan Fruit Co., sec. 34-21s-22e. Cd. sd. showing oil 6,429-38 ft.; T.D. 7,272 ft.; fsg.; P.B. 2,500 ft.; W.O.C.

Rapides Parish

R. D. Webb No. 1 A. M. Brasher, sec. 22-4n-2w. T.D. 2,831 ft.; rmg.

St. Bernard Parish

Gulf Oil Corp. No. 1 Lake Lery, sec. 28-14s-14e. Drlg. sd. and sh. 5,476 ft.

Southern Sulphur Co. No. 2 State Lake Borgne, sec. 38-14s-15e. 13⅜-in. csg. 303 ft.; drlg. sh. 2,522 ft.

St. Charles Parish

Amerada Pet. Corp. and La. Ld. & Expl. Co. No. 1 State, sec. 13-15s-20e. Loc.

St. Landry Parish

Shell Pet. Corp. No. 1 Boagni, sec. 48-8s-4e. 10¾-in. csg. 2,521 ft.; W.O.C.

St. Martin Parish

Texas Co. No. 9 St. Martin, sec. 21-8s-7e 18⅝-in. csg. 106 ft.; drlg. sh. 8,608 ft.

Texas Co. No. 3 State, sec. 14-10s-9e 18-in. csg. 101 ft.; drlg. sh. 2,443 ft.

St. Mary Parish

Texas Co. No. 1 Horse Shoe Bayou, sec. 40-17s-9e. T.D. 10,975 ft.; 7⅝-in. csg. cmtd. on bottom.

Texas Co. No. 1 State-Bateman Lake, sec. 21-16s-12e. 13⅜-in. csg. 1,742 ft.

Terrebonne Parish

Humble O. & R. Co. No. 1 H. J. Ellender sec. 23-19s-19e. 9⅝-in. csg. 8,735 ft.; drlg. sh. 10,502 ft.

Vermilion Parish

Continental Oil Co. No. 1 O. C. Hebert sec. 20-12s-3e. T.D. 11,732 ft.; circulating with mud; well tried to blow out; fsg. for stuck D.S.; hole cleaned to 10,680 ft.; set cmt.; P.B. to 10,800 ft.; sdtrkd. at 10,800 ft.; T.D. 12,216 ft., 5-in. csg. 11,795 ft.; flowed est. 5,000,000 ft. of dry gas per day through ¼-in. ck.; C.P. 3,950 lbs.; T.P. 3,500 lbs. Tubing and csg. sanded up; recovered tubing; milled bit off of 5-in. csg. at 11,975 ft.; fsg. for drill collar and bit at 11,795 ft.; failed to recover bit; P.B. 11,169 ft.; perf. csg. 10,368-76 ft.; swbd.; no shows of oil or gas; P.B. 7,682 ft.; perf. csg. 7,666-75 ft.; I.P. 25 bbls. dist. per day; 2,000,000 ft. gas through 3/16-in. ck.; T.P. 2,800 lbs.; C.P. 2,300 lbs.

West Feliciana Parish

Cavalier Oil Co. No. 1 C. W. Mackie, sec. 59-3s-2w. Drlg. sdy. sh. 4,448 ft.

TEXAS

Week Ending March 20

GULF COAST FIELDS

Raccoon Bend—Austin County

Humble O. & R. Co. No. 7-X Ditmar, Wm. Harvey Sur. Drlg. sh. 900 ft.

Humble O. & R. Co. No. 3-X A. T. McCasland, W. C. White Sur. T.D. 3,123 ft.; 7-in. csg. 3,081 ft.

Humble O. & R. Co. No. 14 L. R. Sherwood, W. C. White Sur. T.D. 4,120 ft.; I.P. 448 B.P.D.; ¾-in. ck.

Hastings—Brazoria County

Coastwied Oil Co. No. 1 Brown, Blk. 12, B.B.B.&C. Sur. T.D. 6,080 ft.; 7-in. csg. 6,055 ft.; I.P. 654 B.P.D.; ¼-in. ck.

Coastwide Pet. Co. No. 2 Cecil Brown, B.B. B.&C. Sur., Lot 1. Drlg. 2,516 ft.

Frost, Lowery & Goldston No. 1 Cecil Brown, center Lot 12, B.B.B.&C. Sur. Spudded.

Humble O. & R. Co. No. 1 J. T. Baker, Lot 13, B.B.B.&C. Sur. Loc.

Humble O. & R. Co. No. 3-B Brown, Perry & Austin Sur. Loc.

Humble O. & R. Co. No. 8-A Brown, Wm. Snyder Sur. T.D. 6,120 ft.; 5½-in. csg. 6,-119 ft.

Humble O. & R. Co. No. 1 H. F. Johnson, Lot 19, B.B.B.&C. Sur. Drlg. sh. 1,942 ft.

Humble O. & R. Co. No. King, H.T.&B. Sur. T.D. 6,080 ft.; 5½-in. csg. 5,976 ft. I.P. 594 B.P.D.; ¼-in. ck.

Humble O. & R. Co. No. 1 C. M. Moody, Blk. 11, B.B.B.&C. Sur. Drlg. sd. 6,080 ft.

Navarro Oil Co. No. 2 Callahan, Lot 5, H.T.&B. Sur. No. 29. Loc

Navarro Oil Co. No. 1 Callahan, Lot 6 H.T.&B. Sur. No. 29. Spudded.

Albert Plummer No. 1 A. W. Brown, C Lot 74, Perry & Austin Sur. Spudded.

Stanolind O. & G. Co. No. 3-A Avitts, H.T.&B. Sur. No. 29. Loc.

Stanolind O. & G. Co. No. 2 Frank M. Berger, H.T.&B. Sur. No. 37. Loc.

Stanolind O. & G. Co. No. 2 Blount, H.T.& B. Sur. No. 29, 10¾-in. csg. 1,664 ft.; drlg. L. 5,334 ft.

Stanolind O. & G. Co. No. 3 C. H. Blount, B. T. Masterson Sur. Loc.

Stanolind O. & G. Co. No. 3 Brown, H.T. &B. Sur. No. 29. Loc.

Stanolind O. & G. Co. No. 1 J. F. Butt, Lot 15, H.T.&B. Sur. No. 29. Loc.

Stanolind O. & G. Co. No. 1 Mary Condton, H.T.&B. Sur. No. 29, Tr. 20. Loc.

Stanolind O. & G. Co. No. 2 Condon, Lot 11, H.T.&B. Sur. No. 29. Loc.

Stanolind O. & G. Co. No. 2 T. C. Edwards, Wm. Henry Sur. T.D. 6,080 ft.; 7-in. csg. 5,998 ft.

Stanolind O. & G. Co. No. 3 Law, H.T.&B. Sur. No. 36. Loc.

Stanolind O. & G. Co. No. 2 Long, H.T.&B. Sur. No. 29. Drlg. sh. and L. 3,730 ft.

Stanolind O. & G. Co. No. 1 A. C. McKibben, H.T.&B. Sur. No. 29. 10¾-in. csg. 1,652 ft.

Stanolind O. & G. Co. No. 2 McKibben, Lot 16, H.T.&B. Sur. No. 29. Loc.

Stanolind O. & G. Co. No. 2 Steve Paul, A. C.H.&B. Sur. No. 2. Loc.

Stanolind O. & G. Co. No. 3 Steve Paul, A C.H.&B. Sur. Loc.

Stanolind O. & G. Co. No. 3 Surface, B. B.B.&C. Sur. 10¾-in. csg. 1,660 ft.; drlg. sh. 5,406 ft.

Stanolind O. & G. Co. No. 8 Williams, A. C.H.&B. Sur. No. 1. Drlg. sh. and L. 4,-600 ft.

Lockridge—Brazoria County

Gulf Oil Corp. No. 1 Fred Reiss, J. W. Hall Sur. T.D. 8,164 ft.; rng. 7,000 ft. of 9⅝-in. csg.; P.B. to 2,400 ft.; sdtrkd.; T.D. 5,000 ft.; 9⅝-in. csg. on bottom.

Gulf Oil Corp. No. 1 Carrie Baker, J. W. Hall Sur. No. 68. T.D. 6,358 ft.; 7-in. csg. 6,348 ft.

Shell Pet. Corp. No. 2 Ramsey State farm, J. W. Hall Sur. No. 68. T.D. 6,370 ft.; rec. 2,000 ft. P.L.O. on D.S.T.; 7-in. csg. 6,350 ft.

Gulf Oil Corp. No. 1-A G. L. Wood et. al., Thomas Alsberry Sur. No. 4 Abst. No. 2. R.U.

Gulf Oil Corp. No. 3 Wilkes Smith, J. W. Hall Sur. R.U.

Manvel—Brazoria County

Burton Drilling Co. No. 1 J. Kroll, center Lot 101, A.C.H.&B. Sur. No. 92. R.U.

R. Olsen No. 2 Nichols, H. N. Little Sur. Drk.

E. A. Stone No. 1 Nichols, E. Little Sur. Drk.

Texas Co. No. 24 Houston Oil Field As. Lot 16, A.C.H.&B. Sur. Drlg. sh. 3,383 ft.

Texas Co. No. 1-B O. L. Rash, T. Spraggins Sur. Drlg. sh. and L. 5,331 ft.

Old Ocean—Brazoria County

Harrison and Abercrombie No. 4 Bernard River Ld. and Development Co., Charles Breen Sur. Bldg. road.

West Columbia—Brazoria County

Texas Co. No. 15 Abrams, George Tenille Lge. Sur. 10-in. csg. 1,156 ft.; drlg. sh. 4,719 ft.

Heyser—Calhoun County

Humble O. & R. Co. No. 6 Elizabeth Welder, J. Maria Rios Sur. Loc.

Humble O. & R. Co. No. 5 E. H. Welder, J. M. Rios Sur. Drlg. 3,315 ft.

Humble O. & R. Co. No. 8-A P. H. Welder, J. M. Rios Sur. T.D. 5,475 ft.; I.P. 7 B.P.H.

Humble O. & R. Co.-Plymouth Oil Co. No. 10-A P. H. Welder, J. M. Rios Sur. Loc.

Humble O. & R. Co.-Plymouth Oil Co. No. 11-A P. H. Welder, J. M. Rios Sur. Loc.

Humble O. & R. Co. and Plymouth Oil Co. No. 12-B P. H. Welder, A. Sisneros Sur. Drk.

Portilla Drlg. Co. No. 12-C P. H. Welder, A. Sisneros Sur. Drk.

Portilla Drlg. Co. No. 13-C P. H. Welder, A. Sisneros Sur. R.U.

Anahuac—Chambers County

Gulf Oil Corp. No. 2 Pommer, sec. 40, H &T.C. Sur. R.U.

Gulf Oil Corp. No. 7 Knowles, W. T. Knowles Sur. Drlg. 1,510 ft.

Gulf Oil Corp. No. 4 G. C. Wilcox, W. T. Knowles Sur. 10¾-in. csg. 2,020 ft.; W.O.C.

Humble O. & R. Co. No. 10 Broussard-Hebert, sec. 59, H.&T.C. Sur. T.D. 7,075 ft.; 5½-in. csg. 7,044 ft.

Humble O. & R. Co. No. 11 Broussard-Hebert, sec. 59, H.&T.C. Sur. Loc.

Humble O. & R. Co. No. 12 J. E. Broussard, sec. 63, H.&T.C. Sur. Drk.

Humble O. & R. Co. No. 12-B White, J. McGahey Sur. Drlg. sdy. sh. 6,999 ft.

Humble O. & R. Co. No. 2 Broussard, sec. 63, H.&T.C. Sur. 9⅝-in. csg. 1,256 ft.; T.D. 7,075 ft.; 5½-in. csg. 7,060 ft.

Humble O. & R. Co. No. 1 E. T. Drought, H.&T.C. Sur., sec. 46. Moving in.

Humble O. & R. Co. No. 10 Gripon, H.&T. C. Sur., sec. 51. Loc.

Humble O. & R. Co. No. 11 Gripon, H.&T. C. Sur., sec. 51. Drlg. sh. and L. 6,349 ft.

Humble O. & R. Co. No. 12 Grippon, H.& T.C. Sur. No. 51. Loc.

Humble O. & R. Co. No. 26 Middleton, H.& T.C. Sur., sec. 62. Loc.

Navarro Oil Co. No. 1 E. Drought, H.&T.C. Sur., sec. 46. T.D. 7,082 ft.; 7-in. csg. 7,064 ft.; I.P. 611 B.P.D.; ¾-in. ck.

Sun Oil Co. No. 24 White, J. McGahey Sur. Drlg. sh. and L. 6,714 ft.

Cotton Lake—Chambers County

Salt Dome Oil Co. No. 1-C Lawrence, S. Barrow Sur. T.D. 6,503 ft.; rec. 200 ft. of P.L.O. on D.S.T.; rng. csg.

Seabreeze—Chambers County

Sun Oil Co. No. 1-A White, J. G. White Sur. No. 128. O.W.D.D.; T.D. 9,055 ft.; cmtd. back to 8,343 ft.; 7-in. csg. 8,290 ft.; cleaning into pits through ⅛-in. ck.; T.P. 2,000 lbs.; C.P. 1,500 lbs.

Sun Oil Co. No. 1-B White, Wm. Mays Sur. 18⅝-in. csg. 1,226 ft.; drlg. sd. and sh. 9,107 ft.

Big Creek—Fort Bend County

Gulf Oil Corp. No. 75 T. W. Davis, M. Young Sur. R.U.

Jenal Oil Co. No. 3 Bryan et al., M. Young Sur. T.D. 3,632 ft.; drlg. plug.

Blue Ridge—Fort Bend County

Texas Gulf Prod. Co. No. 15 Blakely, E. Drew Sur. T.D. 3,949 ft.; I.P. 231 B.P.D.; ¼-in. ck.

Telshaw-Reese and Echelson No. 1 Blakely, E. Drew Sur. Drk.

Boling—Fort Bend County

Crosby et al No. 1 H. R. Farmer, J. Scott Sur. Drlg. gbo. 1,201 ft.

John Deering No. 1 J. M. Moore, Charles Bettner Sur. R.U.

Mack Hank Oil Co. No. 3-B J. R. Farmer, J. Scott Sur. Drlg. sh. 3,669 ft.

Mack Hank Oil Co. No. 4-C E. C. Farmer, J. Scott Sur. Drlg. sh. 4,067 ft.

Mack Hank Oil Co. No. 5-C E. C. Farmer, J. Scott Sur. Loc.

Orchard—Fort Bend County

Gulf Oil Corp. No. 49 J. M. Moore, Germain Immg. No. 8. 13⅜-in. csg. 2,522 ft.; drlg. sh. 5,753 ft.

Gulf Oil Corp. No. 51 Moore, Mark Smith Sur. Drlg. sh. 2,500 ft.

High Island—Galveston County

Stanolind O. & G. Co. No. 1-B Cade, H. Denman Sur. Drlg. sh. 4,692 ft.

Stanolind O. & G. Co. No. 61 Cade, N. Fitzsimmons Sur. Drlg. 600 ft.

Dickinson—Galveston County

Atlantic O. & Ref. Co. No. 1 G. O. Anderson, P. G. Merritt Sur. Drlg. sh. 3,815 ft.

Coast Pet. Corp. No. 6 Maco Stewart, W. K. Wilson Sur. Drk.

Diadem Oil Corp. of Texas No. 2 W. J. Way, F. P. Epperson Sur. Drlg. sd. and clay 1,400 ft.

Diadem Oil Corp. of Texas No. 1 Pauline Frederick. Loc.

Humble O. & R. Co. No. 1-C Bayou Development Co., J. Sellers Sur. Cg. 8,573 ft.

Humble O. & R. Co. No. 15-A Maco Stewart, W. K. Wilson Sur. Loc.

Humble O. & R. Co. No. 16-A Maco Stewart, W. K. Wilson Sur. Drlg. sh. 7,950 ft.

W. E. McKinney et al No. 3-A Galveston-Houston Elec. R.R., W. K. Wilson Sur. Loc.

Pure Oil Co. No. 4 J. W. Shelor, G. W. Banks Sur. Drlg. sd. and sh. 7,991 ft.

Pure Oil Co. No. 1 Sealy Hutchings, P. G. Merrett Sur. 10¾-in. csg. 1,826 ft.; sd. and sh. 7,974 ft.

Sinclair Prairie Oil Co. No. 1 W. Weems, W. K. Wilson Sur. Loc.

Stanolind O. & G. Co. No. 1 Dameani, W. K. Wilson Sur. Drlg. L. and sh. 5,745 ft.

Greens Lake—Galveston County

Sun Oil Co. No. 7 Hughes, sec. 26, W. C. M. Baker Sur. T.D. 4,181 ft.; P.B. to 2,747 ft.; 7-in. csg. 2,712 ft.; comp. for dry gas well.

Silsbee—Hardin County

Humble O. & R. Co. No. 1 Mrs. M. L. Kirby, G. W. Brooks Sur. Loc.

Republic Prod. Co.-Houston Oil Co. No. 6 Brooks, G. W. Brooks Sur. 10¾-in. csg. 1,500 ft.; T.D. 6,961 ft.; 7-in. csg. 6,-944 ft.; I.P. 396 B.P.D.; ¼-in. ck.

Republic Prod. Co.-Houston Oil Co. No. 8 Brooks, G. W. Brooks Sur. 10¾-in. csg. 1,587 ft.; oil sd. 6,808-15 ft.; T.D. 6,970 ft.; 7-in. csg. 6,950 ft.; I.P. 181 B.P.D.; 3/16-in. ck.; T.P. 1,750 lbs.; C.P. 923 lbs.

Republic Prod. Co.-Houston Oil Co. No. 9 Brooks, G. W. Brooks Sur. R.U.

Republic Prod. Co.-Houston Oil Co. No. 10 Brooks, G. W. Brooks Sur. Drk.

Republic Prod. Co.-Houston Oil Co. No. 11 Brooks, G. W. Brooks Sur. Bldg. drk.

Clinton—Harris County

Stanolind O. & G. Co. No. 1 D. A. Oates, C. Martinez Sur., Abst. 543; 9⅝-in. csg. 6,771 ft.; drlg. sdy. sh. 8,067 ft.; top gas sd. 8,063 ft.

Mykawa—Harris County

West Prod. Co. No. 10 W. H. Irwin, W. B. Walker Sur. Drk.

Pierce Junction—Harris County

Hamil & Smith No. 3 Saunders, B.B.B & C. Sur. Top salt 3,981 ft.; T.D. 4,000 ft.; csg. collapsed.

Rio Bravo Oil Co. No. 30-A Settegast, P. H. Kopinan Sur. Drlg. sh. 3,767 ft.

South Houston—Harris County

Stanolind O. & G. Co. No. 6 First Natl. Bank, Callahan and Vince Sur. T.D. 4,-045 ft.; P.B. 2,380 ft.; W.O.C.

Stanolind O. & G. Co. No. 2 Green, H.T. &B. Sur. No. 6. 9⅝-in. csg. 1,429 ft.; W. O.C.

Stanolind O. & G. Co. No. 5 Holland and Price, H.T.&B. Sur. No. 6. 13⅜-in. csg. 90 ft.; W.O.C.

Tomball—Harris County

Humble O. & R. Co. No. 1 Farris et al, W. Usner Sur. T.D. 5,542 ft.; 5½-in. csg. 5,542 ft.; perf. csg.; swbg.

Humble O. & R. Co. No. 1 W. J. Murphy, J. Pruitt Sur. T.D. 977 ft.; W.O.C.

Humble O. & R. Co. No. 4 Theis, C. M. Pillott Sur. T.D. 5,553 ft.; I.P. 278 B.P.D. ¼-in. ck.

Humble O. & R. Co. No. 1 Tomball Townsite Unit 14, R. Hubbard Sur. Drlg. sh. 3,406 ft.

Humble O. & R. Co. No. 1 Tomball Townsite, Unit 13, R. Hubbard Sur. T.D. 5,-584 ft.; 5½-in. csg. 5,578 ft.; I.P. 494 B. P.D.; ¼-in. ck.

Kourey Drlg. Co. No. 2 Hillegeist, J. House Sur. Drk.

Shell Pet. Corp. No. 2 Beeler, J. Pruitt Sur. Drlg. sh. 5,127 ft.

Mauritz—Jackson County

Shell Pet. Corp. No. 1-B Mauritz, Cg. sh. 5,615 ft.

Amelia—Jefferson County

Glenn H. McCarthy No. 3-B Longe, H. Williams Sur. T.D. 5,389 ft.; 7⅝-in. csg. 5,364 ft.; I.P. 15 B.P.H.; ¾-in. ck.

Humble O. & R. Co. No. 1 A. Busceine, C Blk. 3, C. Williams Sur. Loc.

Humble O. & R. Co. No. 1 Freeman, C. Williams Sur. Drlg. sh. 2,985 ft.

Humble O. & R. Co. No. 2 Gist, C. Williams Sur. Drlg. sh. 2,702 ft.

Humble O. & R. Co. No. 1 Industrial Investment Co., Unit 1-B, C. Williams Sur. 13⅜-in. csg. 215 ft.; T.D. 6,526 ft.; D.S. stuck; sdtrkg.

Humble O. & R. Co. No. 1 J. E. LaGrange, Lot 33, Blk. E, C. Williams Sur. Drlg. sd. 4,592 ft.

Humble O. & R. Co. No. 1-B M. I. Lefler, Unit 19, Blk. E, C. Williams Sur. R.U.

Humble O. & R. Co. No. 1-C M. I. Lefler, Lot D, C. Williams Sur. Loc.

Humble O. & R. Co. No. 1 M. Lefler, Amelia Heights Subd., C. Williams Sur. 13⅜-in. csg. 226 ft.; top sd. 6,716 ft.; T.D. 6,784 ft.; rmg.

Humble O. & R. Co. No. 1 A. L. Nolan, Blk. E, Williams Sur. Loc.

Humble O. & R. Co. No. 3 J. H. Phelan, C. Williams Sur. Loc.

Humble O. & R. Co. No. 1 G. Sims, C. Williams Sur. Moving in.

Humble O. & R. Co. No. 4 Tyrell, A. Savery Sur. Drlg. sh. 4,291 ft.

Stanolind O. & G. Co. No. 1 J. W. Hall, H. Williams Sur. Loc.

Stanolind O. & G. Co. No. 2 Sargl, H. Williams Sur. Loc.

Big Hill—Jefferson County

Stanolind O. & G. Co. No. 2 M. E. Fitzhugh, Wm. McFaddin Sur. Bldg. drk.

Fannett—Jefferson County

Gulf Oil Corp. No. 1 Junker, W. A. Smith Sur. Drlg. sd. and sh. 5,537 ft.

LaBelle—Jefferson County

Sun Oil Co. No. 1 John Ward, 933 ft. S of No. 2 Broussard, Wm. Burton Sur. R.U.

Nome—Jefferson County

Shell Petroleum Corp. No. 5 Carpenter, M. Peveto Sur. T.D. 6,055 ft.; W.O.

Shell Pet. Corp. No. 5 Paggi, Kirby Sur. Drlg. sd. and sh. 2,444 ft.

Sun Oil Co. No. 1 Long, J. Blair Sur O.W.D.D.; T.D. 9,045 ft.; cutting and P.B. 5,660 ft.; to sdtrk.; T.D. 6,050 ft.; 5⅜-in. csg. 6,000 ft.

Sun Oil Co. No. 6 Paggi, J. W. Kirby and W. H. Aldridge Sur. Loc.

Sun Oil Co. No. 7 Paggi, J. W. Kirby and W. H. Aldridge Sur. Loc.

Sun Oil Co. No. 1 A. J. Mouboules, J. Blair Sur. 10¾-in. csg. 1,062 ft.; T.D. 8,-157 ft.; rmg.

Spindletop—Jefferson County

Unity Oil Co. No. 3 Oakwood Realty Co., Droegler Sur. Spudded; no report.

Cleveland—Liberty County

Gulf Oil Corp. No. 17-C Kirby, J. Pleasants Sur. R.U.

Gulf Oil Corp. No. 4-C McDonald, T.D. 5,894 ft.; sd. with gas odor.

Hankamer—Liberty County

Gulf Oil Corp. No. 2-A Weiser, George Stengler Sur. Drlg. sh. 3,843 ft.

Hull—Liberty County

Bishop Oil Co. No. 1 C. R. Wilson, J. DeVore Sur. Drlg. 103 ft.

D.&L. Production Co. No. 4 Mecon and Layton, J. DeVore Sur. Drlg. sh. 3,807 ft.

Eclipse Oil Co. No. 1 Barrow, T.D. 6,014 ft.; S.D.

Gulf Oil Corp. No. 23 Baldwin, J. Devore League Sur. Drlg. sh. 2,330 ft.

Republic Prod. Co. No. 162 Dolbear, J. Devore Sur. R.U.

Texas Co. No. 6 Hannah, J. Devore Sur. Moving in.

Esperson—Liberty County

General Crude Oil Co. No. 26 Moores Bluff. Loc.

Bay City—Matagorda County

Hamman Expl. Co. No. 1 J. H. Crocker, E. Hall Sur. 13⅜-in. csg. 1,260 ft.; 9⅝-in. csg. cmtd. at 6,500 ft.; T.D. 9,-575 ft.; 7-in. csg. 9,575 ft.; perf. csg.

8,806-19 ft., 8,832-36 ft., 8,944-8,949 ft., tstd. S.W.; set cmt. retainer at 8,200 ft.; perf. csg. 8,190-94 ft.; flwd. 650 bbls. flowing 470 bbls. of fluid per day through ¼-in. ck., 4 to 8% S.W.; W.P. 300 lbs.

Hawkinsville—Matagorda County

Sun Oil Co. No. 2 Craig, T. Williams Sur. Top salt 796 ft.; base salt 2,099 ft. 18⅝-in. csg. 2,174 ft.; 13⅜-in. csg. 3,700 ft.; drlg. sh. and L. 3,926 ft.

Markham—Matagorda County

G. G. Hamil, Tr., No. 2 T. E. Hudson, H. Parker Sur. Drlg. sh. 130 ft.

Thompson Drlg. Co. No. 1 R. J. Sisk, Blk. No. 2. T.D. 3,285 ft.; comp.; for gas well.

Turman Oil Co. et al No. 1 Hudson, H. Parker Sur. T.D. 3,670 ft.; I.P. 154 B.P.D.; flwg. by heads.

Van Vleck—Matagorda County

Skelly Oil Co. No. 2 W. P. Johnson, W. Cummins Sur. Loc.

Royal Oil Co. No. 1 Fine Holub, M. Cummings Sur. Drk.

Skelly Oil Co. No. 2 Rugely, I.&G.N. Sur. No. 8. 10¾-in. csg. 1,399 ft.; T.D. 7,527 ft.; 7-in. csg. 7,515 ft.

Skelly Oil Co. No. 1 First Natl. Bank, I.&G.N. Sur. No. 7. Drlg. sdy. sh. 7,934 ft.

Conroe—Montgomery County

Normandie Oil Co. No. 27 Falvey, G. Harris Sur. Drlg. 2,010 ft.

Butler & Hornes No. 1 Koonee, Collins Sur. Spudded.

Normandie Oil Co. No. 1 Urech. 7-in. csg. 5,088 ft.; I.P. 580 B.P.D.

Sun Oil Co. No. 6 South Texas Dev. Co. Drlg. sh. 2,549 ft.

Ace—Polk County

Peyton Bros. et al No. 1 McDonald, P. A. Sublett Sur. Drlg. sh. 3,045 ft.

Segno—Polk County

J. K. Dorrance No. 2 Wing Estate, I.&G.N. Sur. No. 15. T.D. 5,197 ft.; 7-in. csg. 5,167 ft.; comp.; no gauge.

J. K. Dorrance No. 3 Wing, I.&G.N. Sur. No. 15. Bldg. drk.

Gulf Oil Corp. No. 1 Wing, I.&G.N. Sur. No. 15. R.U.

Humble O. & R. Co. No. 1 Kirby Lbr. Co., P. Garcia Sur. Drlg. sh. 1,685 ft.

Quintana-O'Connor-Greta—Refugio County

Cosmo Pet. Co. No. 15 Heard, Lot 7. Drlg. sh. 4,678 ft.

Floboots Oil Corp. No. 3-C O'Brien, Winifield Sur. 7-in. csg. 4,390 ft.; I.P. 80 bbls. jetting.

Hewitt & Daugherty No. 40 Lambert, Swisher Sur. No. 7. 7-in. csg. 5,918 ft.; I.P. 1,217 B.P.D.; ⅝-in. csg.

Hewitt & Daugherty No. 41 Lambert, Swisher Sur. No. 7. T.D. 5,897 ft.; 7-in. 5,897 ft.

Illinois Pet. Co. No. 2 Heard, Ximines Sur. Oil sd. 5,530-50 ft.; 7-in. csg. 5,929 ft.; I.P. 48 B.P.H.; ⅝-in. ck.

Josey & Bruton No. 4-A Lambert, Swisher Sur. Cd. sd. 5,883-5,900 ft.; tstg.

Quintana Pet. Co. No. 5 Heard, T. H. Webb Sur. R.U. and S.D.

Quintana Pet. Co. No. 40 Lambert, Swisher Sur. Loc.

Quintana Pet. Co. No. 43 Lambert, Swisher Sur. Loc.

Quintana Pet. Co. No. 46-A Tomoconnor, J. M. Swisher Sur. No. 4. R.U.

Quintana Pet. Co. No. 3 Riley, M. J. Ximines Sur. Cg. 5,975 ft.

Quintana Pet. Co. No. 13-C Tomoconnor, Swisher Sur. Drk.

United Gas Corp. No. 40 Lambert, Blk. 43, Swisher Sur. Cg. 5,900 ft.

United Gas Corp. No. 43 Lambert, J. M. Swisher Sur. Drlg. 5,840 ft.

United Gas Corp. No. 48 Lambert, J. M. Swisher Sur. Spudded.

United Gas Co. No. 12 J. J. O'Brien. Cg. 7,150 ft.

Keeran—Victoria County

Gulf Oil Corp. No. 10 Keeran Estate, M. DeLeon Sur. Drlg. 4,115 ft.

Union of California No. 3 J. M. Keeran Est., M. DeLeon Sur. Drlg. sh. 4,837 ft.

Placedo—Victoria County

Barnsdall-American Liberty Oil Co. No. 3 E. G. Gray, S.A.&M.G. Sur. Drlg. 1,910 ft.

Barnsdall-American Liberty Oil Co. No. 9 J. M. Pickering et al., J. W. Black Sur. T.D. 4,776 ft.; I.P. 10 B.P.H.; 3/16-in. ck.

Barnsdall-American Liberty Oil Co. No. 10 J. M. Pickering, Wm. Rupley Sur. Drk.

Barnsdall-American Liberty Oil Co. No. 14 Pickering, S.A.&M.G. Sur. Drk.

Barnsdall Oil Co.-American Liberty Oil Co., Lot 4, S.A.&M.G. Sur. I.P. 10 B.P.H.; 5/32-in. ck.

Crown Central Oil Co. No. 4 O. M. Lauder, S.A.&M.G. Sur. No. 6. T.D. 4,786 ft.; tstg.; swbd. S.W. and oil.

Magnolia Pet. Co. No. 5 Charles Sklar, S. A.&M.G. Sur. 7-in. csg. 4,758 ft.; T.D. 4,771 ft.; I.P. 60 B.P.D.; ¼-in. ck.

Magnolia Pet. Co. No. 6 Sklar, S.A.&M.G. Sur., Lot 8. Drk.

Shell Pet. Corp. No. 2 Houston Natl. Bank, S.A.&M.G. Sur. No. 7. Drk.

Superior-Gillespie No. 2 Joe Hosek, S.A.& M.G. Sur. No. 70. T.D. 4,767 ft.; I.P. 194 B.P.D.; ¼-in. ck.

Superior Oil Prod. Co. and Gillespie No. 3 J. J. Hosek, S.A.&M.G. Sur. Drk.

Superior Oil Co.-Gillespie No. 4 J. J. Hosek, S.A.&M.G. Sur. Drk.

Westgate Oil Co. No. 6 F. F. Mieska, S.A. &M.G. Sur. No. 10. Drk.

Clay Creek—Washington County

Sun Oil Co. No. 1 H. Lauter, N. Clay, 7-in. csg. 7,445 ft.; T.D. 8,306 ft.; P.B. to csg. seat; perf. csg. 7,549-7,365 ft. and 5,100-10 ft.; tstd. S.W.

Virginia Oil Co. No. 1 Joe Kenieczny, S. M. Williams Sur. 10¾-in. csg. 104 ft.

Five Corners—Wharton County

Texas Co. No. 2-B Pierce Est., J. Caldwell Sur. Loc.

Texas Co. No. 6-B Pierce, J. Hyland Sur. T.D. 5,554 ft.; 7-in. csg. 5,544 ft.; drlg. plug.

Pickett Ridge—Wharton County

Texas Co. No. 33-A Pierce Est., G.B.&N. Sur. No. 4; 9,000-ft. test. Moving in.

Texas Co. No. 1 J. Tlustos, H.&T.C. Sur. No. 192. Drlg. L. and sh. 4,461 ft.

Spanish Camp—Wharton County

Felmont Oil Corp. et al No. 1 Lyle Logue, D. Wade Sur. T.D. 7,901 ft.; 7-in. csg. 3,172 ft.; perf. csg. 3,015-20 ft.; comp. for gas well.

Withers—Wharton County

Texas Co. No. 21-C Pierce, Wm. Pettus Sur. 10¾-in. csg. 1,218 ft.; T.D. 5,556 ft.; 7-in. csg. 5,547 ft.; I.P. 94 B.P.D.; ⅛-in. ck.

Texas Co. No. 23-C Pierce, Wm. Pettus Sur. T.D. 5,556 ft.; 7-in. csg. 5,549 ft.

Texas Co. No. 24-C Pierce Est., Wm. Pettus Sur. 10¾-in. csg. 1,207 ft.

Texas Co. No. 25-C Pierce Est., Wm. Pettus Sur. Loc.

GULF COAST WILDCATS

Austin County

R. L. Hopkins No. 1 J. W. Recnecke, J. Stephenson Sur. R.U.

Brazoria County

Pure Oil Co. No. 1 P. M. Slade, S. F. Austin Lge. T.D. 3,482 ft.; drlg. sdy. L. 4,521 ft.

Texas Co. No. 2 Robbins, James W. Brougham Sur. Drlg. sd. and L. 4,041 ft.

Calhoun County

Matagorda Oil Co. No. 1 Brundet, Tr. 8 Matagorda Island. 13⅜-in. csg. at 1,834 ft.

Colorado County

Humble O. & R. Co. No. 1 Relow Ld. Co., J. L. Duggan Sur. Loc.

Fayette County

McNeil Pet. Co. No. 1 Dybla, A. Thompson Sur. 10¾-in. csg. 21 ft.; drlg. L. 3,278 ft.

Fort Bend County

Earl Trone et al No. 1 E. Trone, H.&T.C. Sur. No. 67. Abd. 150 ft.

Galveston County

Shell Pet. Corp. No. 2 Maco Stewart, 4,400 ft. E of No. 1 J. Spillman Sur. 10¾-in. csg. 1,484 ft.; T.D. 6,250 ft.; fsg.

Hardin County

R. S. Deskin No. 1 Mary B. Collier, O. C. Nelson Sur. Loc.

R. J. Kimball No. 1 Keitle Lbr. Co. Loc.

Harris County

Farrel and Cox No. 1 Bender, N. W. Tr. 1a Sur. 6⅝-in. csg. 1,000 ft.; W.O.C.

R. W. Ford et al No. 1 W. A. and O. C. Pruitt, G. Brooks Sur. Loc.

George Lawrence et al No. 1 Zoppa, J. Farwell Sur. 10¾-in. csg. 605 ft.; T.D. 6,525 ft.; P.B. to test sd. 6,206-26 ft.; stuck drill pipe at 1,500 ft.; hole cleaned; washing to bottom.

R. M. Harrell et al No. 1 F. N. Bullock, Charles Bowman Sur. R.U.

Stanolind O. & G. Co. No. 1 Warren Minerals, H.T.&B. Sur. No. 1. 7⅝-in. csg. 5,749 ft.; drlg. L. 6,636 ft.

Superior Oil Co. No. 1 Bentler, Ehrhardt Sur. Loc.

Texas Gulf Prod. Co. No. 1 Gillespie and Garnsey, Simon Contreras Sur. 10¾-in. csg. 1,438 ft.; T.D. 6,971 ft.; tstd. S.W. on D.S.T. 6,925-71 ft.; cg. 7,403 ft.

Houston County

American Liberty Oil Co. No. 1 J. D. Bean, D.W.R.R. Co. Sur. 10¾-in. csg. 1,796 ft. cd. S.W. sd. 6,092 ft.

H. L. Hunt No. 1 J. E. Elliott, J. M. Procella Sur. 13⅜-in. csg. 495 ft.; drlg. sh. and L. 4,057 ft.

Jackson County

Texas Co. No. 1 T. A. Mauritz, Morris and Cummings Sur. Drlg. sh. 4,202 ft.

Jefferson County

Humble O. & R. Co. No. 1 Jefferson Ld. Co., C. Hillibrant Sur. T.D. 8,232 ft.; 7-in. csg. 8,162 ft.; T.D. 8,458 ft.; cutting and pulling stuck D.S.; P.B. 7,860 ft.; drld. out 7,880 ft.; perf. csg.; tstg.

Magnolia Pet. Co. No. 1 J. H. Phelan, T.&N.O. Sur. No. 14. R.U.

David B. MacDaniel et al No. 1 Nona Mills, J. C. Grant Sur. R.U.

Lavaca County

Wilshire Union Oil Co. No. 1-A Pohl, W. Bass Sur. T.D. 3,250 ft.; P.B. 2,950 ft., two tests failed; S.D.

Liberty County

Kenco Oil Corp. No. 1 E. B. Pickett, H. T.&B. Sur. No. 10. 10¾-in. csg. 1,237 ft.; abd. 7,566 ft.

Matagorda County

Continental Oil Co. No. 2 Robbins, J. C. Franz Sur. 11¾-in. csg. 6,430 ft.; T.D. 8,908 ft.; run 8⅝-in. csg.

Glenn McCarthy No. 1 Foley, sec. 19, Susan Perkins Sur. 10¾-in. csg. 2,008 ft.; T.D. 8,585 ft.; oil sd.; rng. 7-in. csg. to test.

United North and South Development Co., J. S. Cotton Sur. Drlg. sd. and sh. 8,494 ft.

Polk County

Mayo et al No. 1 Catline Mayo, J. G. Loving Sur. 10¾-in. csg. 250 ft.; drlg. sh. 3,045 ft.

Refugio County

Wynne Drlg. Co. No. 1 C. D. Roadche-J. Patrick and J. Downey Sur. S.D. 5,500 ft.

Tyler County

Republic Prod. Co.-Houston Oil Co. No. 2 Hurd, N. Hurd Sur. 10¾-in. csg. 2,296 ft.; cg. 4,983 ft.

Victoria County

Commonwealth O. & G. Co. No. 3 W. H. Bennett, J. Estuvan-Galbon Sur. Drlg. 5,000 ft.

Magnolia Pet. Co. No. 1 Annie B. Wayne, T.&N.O. Sur. No. A-407. Drlg. sh. 3,612 ft.

Walker County

Garland, Hartman & Page No. 1 Carey Ld. & Dev. Co., D. M. McDonald Sur. R.U.

Waller County

Nine Blumenthal No. 1 Alex P. Kelley, S. H. Haddin Sur. R.U.

Sumas Prod. Co. of Austin No. 1 J. J. Menker, 10¾-in. csg. 300 ft.; S.D. 5,092 ft.; may abd.

H. E. Williams No. 1 T. C. Giddings Est., David Mouser Sur. sh. Drlg. 3,600 ft.

Washington County

Smith & Schlinke No. 1 Woode, J. Clark Sur. S.D. 3,000 ft.

Wharton County

J. F. Hutchins No. 1 J. J. Winsley, James Tumlinson Sur. 10¾-in. csg. 647 ft.

Texas Co. No. 1 Kluck, Jos. Hyland Sur. Cg. 6,164 ft.

Texas Co. No. 1 E. A. Wheatherer, L. P. Ogden Sur. Cg. sh. 5,567 ft.

S. W. TEXAS WILDCATS

Aransas County

Barnsdall Oil Co. No. 1-A Kate Edwards, 330 ft. S line, Lot 85, 660 ft. SW No. 1, Wm. Lewis Sur. Set 10¾-in. csg. 1,408 ft.; drlg. 6,020 ft.

Atascosa County

Frontier Oil Co. No. 1 Oppenheimer, John Sharp Sur. Set csg. 2,770 ft.; bailing.

R. J. Roberts et al No. 1 Elder, Sur. 190. Drlg. 911 ft.

Bee County

Dirks Bros. No. 1 Strouch, 990 ft. S line, 150 ft. W line, 50-ac. tr., sec. 19, Uranga Gr. D.S.T. 4,339-77 ft.; rec. 400 ft. P.L.O. in. 15 min. with 20 lbs. W.P.; comp.; 180 B.P.D. on 3/16-in. ck.

J. R. Dougherty No. 1 Weiss, 1,300 ft. E line, 6,200 ft. N line, Uranga Gr. D.&A. 4,650 ft.

W. C. McBride, Inc., No. 1 Brown & Hansen, J. Pace Sur. Pettus sd. 3,567 ft.; dry ;drlg. 3,597 ft.

Blanco County

E. L. Nixon No. 1 Hornberger, 1,200 ft. S line, 300 ft. E line, Sur. 723. Drlg. 816 ft.

Brooks County

Texas Gulf Prod. Co. No. 1 Proctor, 330 ft. S and E lines, Blk. 2, sec. 20, Los Almos and Loma Blanca Surs. Cg. sh. 5,967 ft.

Burleson County

M. R. Exploration Co. No. 3 Fountain, Wm. Raleigh Sur. M.I.M.

Red Bank Oil Co. No. 2 Grann, 3,063 ft. N line, 1,900 W line, E. Santef Sur. M.I. Rig.

Caldwell County

C. A. McDaniels No. 1 Trammel, H. Hunter Sur. Drlg. chalk; no report.

C. A. McDaniels No. 1 Tinkle, S. Seal Sur. T.D. 2,681 ft.; P.D. 2,490 ft.; swbg. oil.

George Young No. 1 Schmidt, 1,265 ft. E line, 150 ft. S line, Williams Sur. Set csg. 1,362 ft.; W.O.C.

Cameron County

Saxet Prod. Co. No. 1 Port Isabel Irr. Co., 600 ft. N line Loma Alta Lake, Sh. 29, Espiritu Santo Gr. Loc.

Stapper Petroleum Corp. No. 1 Port Isabel Irrigation Co., Blk. 17, P.I.I.Co. Subd., Santo Gr. Drlg. 4,973 ft.

Dimmitt County

Wilcox O. & G. Co. No. 1 Light ranch, NW Blk. Loc.

Duval County

Argo Oil Co. and Clopton No. 2 Smith-Corkill, Sur. 61. T.D. 3,140 ft.; P.B. 2,760-88 ft.; comp.; 30 bbls. oil, 70 bbls. S.W. per day; T.D. 2,737 ft.

Argo Oil Co. No. 3 Smith-Corkell, Sur. 498. Cg. 2,087 ft.

Clark & Cowden No. 3 Richardson, 2,310 ft. W line, 330 ft. S line, Sur. 5. Loc.

Diamond Half Oil Co. No. 1 Sinclair, sec. 405. Loc.

Frank Gravis No. 1 Vaello Puig, 330 ft. W line, 2,718 ft. S. line, 1,760.73-ac. tr., Sur. 250. Drlg. 2,572 ft.

C. K. Gravis No. 1 Holzapfel, N½ Sur. 42. Tstg. sd. 990-1,040 ft.

Intrepid Oil Co. No. 3 Parr, SW¼, sec. 26. Loc.

Magnolia Pet. Co. No. 1 D.C.R.C., 330 ft. S and W lines, lse., sec. 902. Loc.

Edwards County

Auld, Dodson & Lyman No. 1 Rigsby, sec. 16. Loc.

I.T.I.O. No. 1 Love & Evans, sec. 66, Blk. 3, G.W.T.&P. Ry. Sur. (Workover). Prep. deepen from O.T.D. 3,002 ft. to 6,250 ft.

Fayette County

McNeil Pet. Co. No. 1 Dybola, A. Thompson Lge. R.U.

Frio County

Amerada Pet. Corp. No. 1 Harriman, Flores Sur. 306. Drlg. 3,536 ft.

Goliad County

Rual Singer No. 1 C Wood, Geo. Villa Sur. T.D. 6,004 ft.; D.&A.

Gonzales County

M. S. Holliday No. 1 Edwards, W. W. Page Lge. T.D. 1,700 ft.; D.&A.

Guadalupe County

Louis Crouch No. 1 King, J. D. Clements Sur. R.U.

Lincoln Pet. Co. No. 1 Baenzinger, Mansola Sur. Set csg. 1,990 ft. Drlg. plugs.

J. B. Stoddard No. 1 Harris, G. DeWitt Sur. Top chalk 2,036 ft.; T.D. 2,146 ft.; D.&A.

Hidalgo County

Dale Smith No. 1 Fairbanks & Young, Blk. 44. Porc. 46, jurisdiction of Reynosa. Drlg. 2,316 ft.

Rinehart et. al. No. 1 White, 7,500 ft. E line, 7,200 ft. N line, Ejidos Gr. Spudded; S.D.

Sun Oil Co. No. 1-A Sweeny Est., Lot 1, Wayne Wood Subd. No. 2. T.D. 6,598 ft.; stdg.

Jim Hogg County

Cole Pet. Co. No. 1 Yeager, Sur. 452. R.U.

Gifford Oil Co. No. 1 Armstrong, Sur. 41. 5-min. D.S.T. 3,056-63 ft.; made 400 lbs. dry gas; sd. 3,056-61 ft.; fsg. 4,358 ft.

S. Payne No. 1 Holbien, 150 ft. N and W lines, Blk. 10, Sh. 3, Animas Gr. R.U.

Jim Wells County

Arkansas Fuel Oil Co. No. 1 G. H. Bierstadt, Blk. 32, Reynolds Sur. T.D. 5,017 ft.; P.B. 4,665 ft.; to sdtrk. to recore sec.

Baltic Drlg. Co. No. 1-A Owens, Sur. 181. Sd. 5,612-16 ft.; tstd. dry gas; cg. deeper.

Tesmalis & Reese No. 1 Martha Earhart, 330 ft. S and W lines, 80-ac. tr., Suggs Sur. Drlg. 1,517 ft.

Karnes County

De Graff & Reele No. 1 Cochran, 460 ft. E line, 160 ft. S line, McConnell Lge. Drlg. 573 ft.

Victoria Drlg. Co. No. 1 John Yanta, J. Hardaway Sur. T.D. 1,511 ft.; S.D.

Victoria Drlg. Co. No. 1 Wm. Yanta, J. Hardaway Sur. M.I.M.

Kerr County

S. W. Forrester No. 1 Baily, Brendle Sur. No. 408. Washing down 740 ft.

Live Oak County

H. Coquat No. 1 L. Reagan, Santiago McGloin Sur. T.D. 3,507 ft.; D.&A.

R. A. David et al No. 1 Border Nat'l Bank, 150 ft. N and W lines, 150-ac. tr., Hayes Sur. Loc.

R. H. Feltner No. 2 Sanger, 330 ft. W line, 990 ft. N line, Sur. 385. Loc.

E. M. Jones No. 3 Ezell, SE¼, sec. 3, Ezell ranch. Loc.

Loma Oil Co. No. 2 Cardwell, 95-ac. tr., Sparks Sur. Loc.

Marzo Oil Co. No. 1 Chestnut, L. Ayres Sur. Pettus sd. 1,240-48 ft.; T.D. 1,275 ft.; S.D.; W.O.O.

Reynolds & Richardson et al No. 1 Geo. West, 330 ft. N and W lines, sec. 515, J. Poitevent Sur. T.D. 3,400 ft.; D.&A.

R. B. Sanger No. 1 Adams, 330 ft. N and E lines, 80-ac. tr., Sur. 122. R.U.

L. W. Steiren No. 1 Lang, N. Simmons City. R.U.

McMullen County

Big Rock Oil Corp. No. 1 Martin, Uleiting Sur. No. 6. S.D. 532 ft.

Howell Oil Corp. No. 1 Martin, Sur. 213. Loc.

Humble O. & R. Co. No. 1 Gouger, 330 ft. S and E lines, SE¼, sec. 46. Loc.

Rowan & Hope No. 1 Rhodes, NE¼ sec. 18, Seale & Morris Sur. M.I.M.

Medina County

A. Chmel No. 1 Odem, 160 ft. W line, 493 ft. N line tr., Castro Sur. 174. M.I.M.

Gates, Hill & Mead No. 1 Kreisle, Sur. 903. Loc.

Nueces County

Allen & Seaboard Oil Corp. No. 2 Chapman, 660 ft. S and W lines, sec. 38, 10-min. D.S.T. 6,462-71 ft. with 930 ft. water

LEGAL

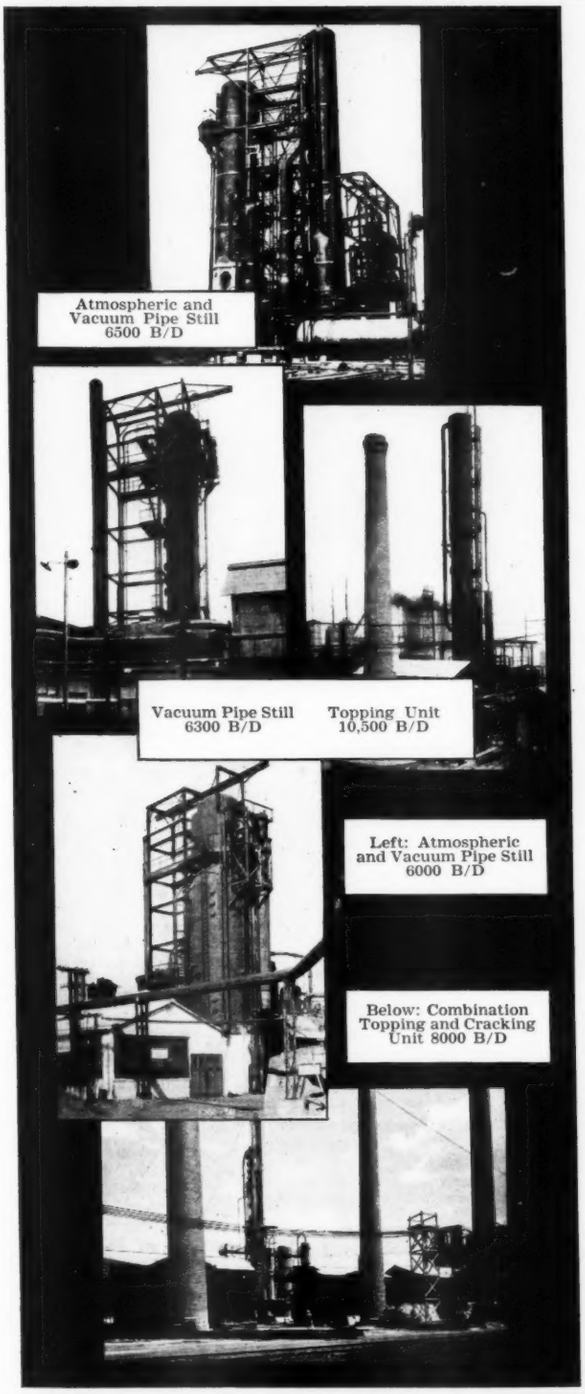
U. S. Department of the Interior, General Land Office, Washington, D. C. Notice is hereby given that Unit No. 1 embracing SW¼, SW¼ Sec. 4, T. 23 N., R. 15 W., 40 acres, and Unit No. 2, embracing NW¼ SW¼, S½, SW¼, SW¼, SE¼, Sec. 6, T. 23 N., R. 15 W., 113.38 acres, in the Rodessa Oil and Gas Field, Caddo Parish, Louisiana, are offered to the responsible qualified bidder of the highest bonus per acre, the minimum bid being $1 per acre, under section 17 of the leasing act of February 25, 1920 (41 Stat. 437), as amended by the act of August 21, 1935 (49 Stat. 674), at the royalty rate scale in the lease form shown in Circular 1386, at a sale to be held in the Federal Court Room, Post Office Building, Shreveport, Louisiana, at 12:00 noon, on April 23, 1937. The successful bidder must deposit on the day of the sale a certified check on a solvent bank, or cash, for one-fifth of the amount of each bid and file the showing of qualifications to receive a lease required by section 7 of General Land Office Circular 1386. The remaining four-fifths, together with the annual rental in advance at the rate of $1 per acre must be paid prior to the issuance of the lease. The bidders are warned against violation of the provisions of section 59 of the United States Criminal Code approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids at the discretion of the Secretary of the Interior. (Signed) Fred W. Johnson, Commissioner.

REDUCE OPERATING COSTS

with

Carey

HIGH EFFICIENCY HEAT INSULATIONS


Atmospheric and Vacuum Pipe Still 6500 B/D
Vacuum Pipe Still 6300 B/D
Topping Unit 10,500 B/D
Left: Atmospheric and Vacuum Pipe Still 6000 B/D
Below: Combination Topping and Cracking Unit 8000 B/D

Fractionating Towers
Stills
Reaction Chambers
Condensers
Heat Exchangers
Drums
Evaporators
Boilers
Combustion Chambers
Dewaxing Plants
Brine Coolers
Piping

●

The heaters of the plants illustrated on the left were Carey insulated.

For temperature ranges up to 2500° F. there is a Carey Insulation to meet all requirements of the Petroleum Industry . . . the Carey Line includes Asbestos and Magnesia Pipe Coverings . . . Rock Wool Blankets . . . Hi-Temp Blocks and Bricks . . . Diamataceous Earth . . . 606 Cement for Monolithic Construction . . . Thermotex Waterproof Coatings . . . Fireproof Asbestos Sheets . . . Careystone Asbestos Corrugated Roofing and Siding . . . Asbestos Fibres and Felts . . . Asphalt Felts . . . and Pipe Line Felts.

Carey

85% MAGNESIA

THE PHILIP CAREY COMPANY · LOCKLAND · CINCINNATI, OHIO

cushion, recovered. 1,080 ft. 42 grav. P.L.O. with W.P. 20 lbs.; cored oil sd. 6,464-83½ ft.; sh. 6,483½-6,507 ft.; T.D. 6,720 ft.; set csg.; perf. 6,464-83½ ft.; made S.W.; recmtd. and perfd. 6,460-67 ft.; comp.; 5 B.P.H. on ⅛-in. ck.; sd. 6,464-84 ft.

E. M. Jones No. 1 Cook, 2,500 ft. N line, 330 ft. E line, 546-ac. tr., Guadrilla Irr. Co. Sur. 139. Sd. 3,532-39 ft.; slight S.G.; drlg. 4,253 ft.

Mills Bennett Prod. Co. No. 1 Lamb, 330 ft. E Mathis Highway, 330 ft. N line, 80-ac. tr., 527.4-ac. tr., V. Lopez de Herrera Sur. T.D. 7,202 ft.; D.&A.

Sloan & Green No. 1 Cassens, sec. 36, Longorio Sur. R.U.

Southern Minerals Corp. No. 1 R. King, sec. 32, King Farm Lots. D.S.T. 4,021-33 ft.; rec. 400 ft. oil and mud and 45 ft. S.W.; 6 lbs. W.P. in 15 min.; cg. ahead.

Steve Paul No. 1 Smith, 1,650 ft. E line, 330 ft. S line, sec. 38, Flour Bluff Encinal Trs. Loc.

Baltic Drlg. Co. No. 1 Poenisch, Lot 2, Blk. 32, Flour Bluff Addn. (workover of former Hurlburt test). O.T.D. 6,250 ft.; R.U.; S.D.

Real County

Sun Oil Co. No. 1 Dietert, 1,980 ft. E line, 660 ft. S line, sec. 7, G.W.T.&B. Sur. Drlg. 5,583 ft.

San Patricio County

Buckingham Oil Co. No. 1 G. Davis, Sec. 27, Loc.

Eleanor Oil Co. No. 1 Davis, 208.8-ac. tr., G. Grover Sur. M.I.M.

Eleanor Oil Co. No. 1 Green Est., 1,674-ac. tr., T. T. Williamson Sur. Sds. 6,573-77 ft., 6,580-90 ft. and 6,592-96 ft.; odor oil; D.S. tstg.

Phillips Pet. Co. No. 1 Schmidt, sec. 31, Paul Subd. Attempted D.S.T. 5,330-53 ft.; failed to hold; rec. 100 ft. mud and oil odor; to retest 5,353 ft.

Windsor Oil Co. No. 1 Bissett, Tr. 8 Tivoli Subd., Crockett Sur. Loc.

Starr County

J. H. Clopton No. 4 Tijerina, Lot 12, Sh. 14-C, Porc. 80. Drlg. 176 ft.

Cook, Morris & Arnold No. 2 S.C.C.C., Blk. 22, Porc. 89. R.U.

C. T. Daye No. 1 Seabury, Sh. 5, Porc. 75. Drlg. 277 ft.

Dodd Trustee No. 1 Wood Estate, Porc. 84. Set csg. 1,755 ft.; W.O.C.

Donroy Oil Co. No. 1 Ramon, 2,400 ft. SE line, 150 ft. SW line, sec. 150. Drlg. 282 ft.

G. Harraun No. 1 Guerra, Blk. 6, Porcs. 55 and 56. R.U.

Webb County

J. M. Anderson No. 1 Juarez, Blk. 13, Sur. 1,111. T.D. 2,526 ft.; rng. elec. survey.

Bolling & Coffey No. 1 So. Tex. Oil Co., Sur. 768. Loc.

French Oil Co. No. 2 Garcia, S½, Sur. 1,121. T.D. 2,186 ft.; D.&A.

O. W. Killam No. 1 fee, Sur. 1,690. Drlg. 5,056 ft.

O. W. Killam No. 1 Laurel Bros., Sur. 333 Loc.

Lu-Tex Oil Co. No. 1-A Lone Star Const. Co., Blk. 26, Porc. 12, 13 and 14. Drlg 1,521 ft.

Mills Bennett Prod. Co. No. 1 Martinez Blk. 84, Sh. 1, E. P. Grullo Gr. Fsg. 2,300 ft.

Mills Bennett Prod. Co. No. 2 Slator, Blk. 89, Mission Subd., Borrego Gr. Loc.

Joe Palmer No. 1 Laredo Natl. Bank 1,980 ft. S and W lines, Sur. 463. Drlg. 1,361 ft.

Wilcox O. & G. Co. No. 1 Dunbar, Sur. 2,292, J. Galen Gr. Drlg. 5,387 ft.

Willacy County

Ruez-Morton, Inc., No. 1 F. Armendias, C Lot 9, Sh. 4, San Juan de Carricitos Gr. Drlg. 537 ft.

Ruez-Morton, Inc., No. 1 Johnson-Stillman, Lot 14, Blk. 25, Sh. 44, San Juan de Carricitos Gr. Drlg. sh. 526 ft.

Shell Pet. Corp. No. 1 Yturria, Sh. 64, San Juan de Carricitos Grant (workover). T.D. 7,662 ft.; to drill deeper; R.U.

Zapata County

Fidelity Oil & Roy. Co. No. 1 Gopher Unit, Blk. 9, Sur. 6. Drlg. 527 ft.

H. Guinn Lewis No. 1 S. Benavides, Blk. 39, Villa Gr. Drlg. 462 ft.

R. Wheeless No. 1 Welch, Blk. 1. E. K. Bateman Subd. Drlg. 1,316 ft.

Zavalla County

Wilcox O. & G. Co. No. 1 Gillman, sec. 11. Drlg. 2,367 ft.

S. W. TEXAS PROVEN

McCampbell—Aransas-San Patricio Counties

Atlantic Ref. Co. No. 2 Maryland Trust Co., 330 ft. N and E lines, Blk. 23. Drlg. 1,426 ft.

Atlantic Ref. Co. No. 4-B McCampbell Lot 7, Blk. 40. Drlg. 6,477 ft.

Atlantic Ref. Co. No. 3-C McCampbell, Blk. 40. D.&A. 6,551½ ft.; perf. 6,540-44 ft.; made S.W.

Atlantic Ref. Co. No. 4-C McCampbell Lots 11 and 12, Blk. 40. Drlg. 1,562 ft.

Buckingham Oil Co. No. 2-B McCampbell, Lot 13, Blk. 40. Drlg. 4,526 ft.

Buckingham Oil Co. No. 4-A McCampbell, Blk. 41, Orick Sur. Sd. 6,540-48 ft.; rmg. to test.

Collins & Broughton No. 1 McCampbell, Lot 5, Blk. 37, McCampbell Subd. Drlg. 6,551 ft.

Hooper & Rutherford No. 1 Scrivner, 330 ft. NE and NW line, Lot 16. R.U.

Landreth Prod. Co. No. 1 McCampbell, Lot 4, Blk. 40. Drlg.

J. Nelson No. 1 Riggs, 330 ft. NW line 213 ft. SW line, 6.46-ac. tr., Tra. 12 and 13, Blk. 16. Loc

Hilbig—Bastrop County

Joe E. Mills No. 1 Askew, 600 ft. NW line, 1,525 ft. SW line, 278.5-ac. tr. Wolfenberger Sur. T.D. 2,907 ft.; S.D.

Cosden—Bee County

Elwood & Young No. 3 Barnett, John Place Sur. Sd. 3,636-53 ft.; S.O.; P.B. 3,966 ft.; T.D. 4,050 ft.; S.D.; W.O.O.

Plummer—Bee County

W. C. McBride No. 1 Plummer, 34-ac. tr., sec. 33, Plummer-Chessman Sur Loc.

H. J. Weinert No. 1 Smith, Plummer-Chessman Sur. T.D. 1,180 ft.; S.D.

Alta Mesa—Brooks County

Standard of Texas No. 1 Garcia, 1,398 ft. N and W lines, Tr. 1, Sh. 1-A, La Mestina de Gonzales Sur. Drlg. 2,447 ft.

Standard of Texas No. 3 Garcia, 615 ft. S line, 465 ft. W line, Tr. 1, Sh. 1-A, La Mestina de Gonzales Sur. Drlg. 2,456 ft.

Alta Verde—Brooks County

L. & W. Oil Co. No. 1 Wm.Singer, Blk. 8 Sur. 436. Sd. 515-20 ft.; set ⅛-in. csg. 934 ft.; T.D. 948 ft.; tested sulfur wtr. with S.O.; prep. to drill deeper.

Branyon—Caldwell County

Adams & Lyles No. 3 Ellison, D. Cooper Sur. Cg. 2,047 ft.

R. B. Byrd No. 1 McGee, J. A. Neal Sur. Drlg. 212 ft.

Lincoln Pet. Co. No. 4 Branyon, Cooper Sur. Loc.

Taylor Pet. Co. No. 1 Caldwell County, 4-ac. tr., D. Cooper Sur. Drlg. 566 ft.

Whisenant & Trenchard No. 1 Young, J. R. Miller Sur. T.D. 2,225 ft.; R.U. to pmp.

Slick—DeWitt County

Geo. B. White No. 2 Poetter, O. Marshall Sur. T.D. 4,457 ft.; D.&A.

Charamousca—Duval County

Magnolia Pet. Co. No. 1 D.C.R.C., Sur. 152, T.D. 2,995 ft.; D.&A.

Colmena—Duval County

Conservative Oil Co. No. 1 Brown-Lentz, Blk. 12, sec. 51. Tstg. 1,460-70 ft.

Conservative Oil Co. No. 6 D.C.R.C., Blk. 12, Sur. 51. P.B. from T.D. 1,521 ft.; W.O.C.

Hooper & Rutherford No. 2 D.C.R.C., Tr. 13, sec. 51. Drlg. 230 ft.

Wellington Oil Co. No. 4 D.C.R.C., Blk. 10, sec. 51. Set csg. on sd. 1,457-77 ft.; comp.; 129 B.P.D.; T.D. 1,487 ft.

Wellington Oil Co. No. 5 D.C.R.C., Blk. 10, sec. 51. R.U.

Driscoll—Duval County

Continental Oil Co No. 13-A Sevier, Sur 448. Drlg. 3,396 ft.

El Mesquite—Duval County

Rogers & Rogers No. 3 Pena, El Mesquite Gr. R.U.

Government Wells—Duval County

Magnolia Pet. Co. No. 6 Harvill, NE¼ SW¼, Sur. 64. Tstg. sd. 2,502 ft.

Magnolia Pet. Co. No. 16 Wilson, Sur. 248. Loc.

San Diego Oil Corp. No. 1 Millard, Sur. 64. Comp.; 25 B.P.D. at 2,514 ft.

Hoffman—Duval County

Bridwell Oil Co. No. 7-B Hoffman, Sur. 122. R.U.

Duval Oil Corp. No. 10 Hoffman, Sur. 118. Sd. 2,876 ft.; comp.; 15 B.P.H. on ½-in. ck.

Duval Oil Corp. No. 11 Hoffman, Sur. 118. R.U.

Plymouth Oil Co. No. 5 Hoffman, 1,650 ft. N line, 2,310 ft. E line, Sur. 117. T.D. 2,866 ft.; D.&A.

Standard of Kansas No. 3 Green, Sur. 11. Sd. 2,716-18 ft.; comp.; 180 B.P.D.; jetting; T.D. 2,830 ft.

Standard of Kansas No. 4 Green, Sur. 118. Loc.

Kohler—Duval County

Chiquita Oil Co. No. 1 Peters, 162-ac. tr., Sur. 162. Drlg. wtr. well.

Humble O. & R. Co. No. 55-A Kohler, Sur. 164. Set csg. 2,633 ft.; W.O.C.

Humble O. & R. Co. No. 3 Peters, sec. 398. Flwg. 10 bbls. fluid for 17 hrs., 36% wtr.; T.D. 2,658 ft.; P.B. 2,655 ft.; comp.; 156 B.P.D.

Sun Oil Co. No. 1 Peters, 330 ft. S and W lines, Sur. 161. Set csg. 2,446 ft.; comp.; gasser; spraying oil.

Windsor Oil Co. No. 5-B Peters, Sur. 34. Loc.

Labbe—Duval County

Magnolia Pet. Co. No. 3 Labbe, 330 ft. N and E lines, Sur. 221. R.U.

Loma Novia—Duval County

Coffield & Lanning No. 1 Ritter, 330 ft. S line, 1,120 ft. W line, sec. 73. Cg. ahead 2,553 ft.

Duval Oil Corp. No. 30 Bishop, sec. 57. T.D. 2,577 ft.; comp.; 8 B.P.D.

Duval Oil Corp. No. 31 Bishop, sec. 57. T.D. 2,573 ft.; comp.; 276 B.P.D.

Duval Oil Corp. No. 32 Bishop, sec. 57. Loc.

Eastern Texas Prod. Co. No. 5 Hubbard Sur. 71. R.U.

F. J. Gravis No. 2 Hahl, SE¼, NE¼, sec. 64. R.U.

Hamil & Smith No. 4 Pure-Ruiz, sec. 41. Loc.

Humble O. & R. Co. No. 18-A Hubbard, Sur. 83. Drlg. sh. 2,187 ft.

Humble O. & R. Co. No. 19-A Hubbard, Sur. 83. Tstg. 2,818 ft.

Humble O. & R. Co. No. 14-B Hubbard, Sur. 42. Drlg. 2,210 ft.

Humble O. & R. Co. No. 19-B Hubbard, Sur. 42. Drlg. sh. 2,286 ft.

Humble O. & R. Co. No. 23 Ruiz, Sur. 553. T.D. 2,780 ft.; swbg.

Humble O. & R. Co. No. 24 Ruiz, Sur. 553 Drk.

Humble O. & R. Co. No. 28 Ruiz, Sur. 553. Cg. 2,776 ft.

Leach & Wilson No. 3 Wright, Sur. 72. Comp.; 152 B.P.D.; T.D. 2,614 ft.

Magnolia Pet. Co. No. 13 Herbst, Sur. 70. M.I.M.

Sloan Oil Co. No. 4-A Hubbard, Sur. 7 M.I.M.

Steiren & Wright No. 14 Wright, Sur. 72. D.&A. 2,623 ft.

Texas Co. No. 22 Bishop, Sur. 57. Set csg. 2,567 ft.; W.O.C.

Lopez—Webb—Duval Counties

Humble O. & R. Co. No. 12 D.C.R.C., Sur. 901. Set csg. on sd. 2,088 ft.; W.O.C.

Humble O. & R. Co. No. 13-C D.C.R.C., Sur. 901. Rng. csg. 2,083 ft.

Hunter Co. No. 2-B Billings, Sur. 113. Comp. 204 B.P.D.; T.D. 2,222 ft.

C. F. Lewis No. 9-A Lopez, sec. 110. Comp.; 252 B.P.D. on ½-in. ck.; T.D. 2,989 ft.

C. F. Lewis No. 14-A Lopez, sec. 110. Swbg. in.

Sierra Oil & Roy. Co. No. 3 Billings, Sur. 113. T.D. 3,437 ft.; P.D. 2,227-34 ft.; set csg.; W.O.C.

Lowe Ranch—Duval County

Atlantic Ref. Co. No. 1 Lowe, 330 ft. E line, 1,678 ft. SW of NE cor., Sur. 466. R.U.

Palangana—Duval County

F. J. Gravis No. 2-A Schallert, Sur. 255. R.U.

Penn Palangana Oil Co. No. 3 C. K. Gravis, Sur. 250. R.U.

Peters—Duval County

Rio Bravo Oil Co. & Coates No. 2-C Peters, Sur. 398. T.D. 2,846 ft.; D.&A.

Piedra Lumbre—Duval County

Magnolia Pet. Co. No. 13 D.C.R.C., sec. 100. Drlg. 267 ft.

Seven Sisters—Duval County

A. J. Brinkdeter No. 1 Garcia, Sur. 212. Drlg. 1,483 ft.

Dulce Oil Co. No. 5 Serna, Sur. 384. T.D. 2,496 ft.; comp.; 288 B.P.D. on ¼-in. ck.

Humble O. & R. Co. No. 5 Dowdy, sec. 272. Set 5½-in. csg. on sd. 2,550 ft.; sd. 2,556-66 ft.; comp.; 11 B.P.H. on ⅛-in. ck.

Humble O. & R. Co. No. 6 Dowdy, sec. 272. Comp.; 22 B.P.H.; T.D. 2,557 ft.

Humble O. & R. Co. No. 7 Dowdy, sec. 272. Drlg. sh. 293 ft.

Reliance Oil & Roy. Co. No. 1-A Lichtenberger, sec. 225. T.D. 2,720 ft.; reworking for completion; sd. 2,556-66 ft.; comp. 11 B.P.H. ½-in. ck.

Reliance Oil & Roy. Co. No. 2 Lichtenberger, S½, sec. 225. R.U.

Texas Co. No. 13 Badgley, Sur. 307. T.D. 2,514 ft.; cleaning in pits.

Westheimer & Daube No. 30 Campos, Sur. 224. T.D. 2,221 ft.; comp.; 192 B.P.D.

Westheimer & Daube No. 31 Campos, Sur. 224. Tstg. sd. 2,709 ft.

Westheimer & Daube No. 32 Campos, Sur. 224. Tstg. sd. 2,717 ft.

Sweeden—Duval County

Hiawatha C. & G. Co. No. 1 Herberger, 330 ft. S and W lines, sec. 10, Agua Poquita Gr. Sd. 5,875-87 ft.; cg. deeper.

Hiawatha O. & G. Co. No. 1 Miller, 330 ft. N and E lines, sec. 24, Agua Poquita Gr. 4-min. D.S.T. 5,868-87 ft.; tool slpd.; rec. 480 ft. gas-cut mud; odor oil, completing.

Pearsall—Frio County

Amerada Pet. Corp. No. 8 Halff & Oppenheimer, S. A. Ditch Sur. 1,104 (W.O.). Drlg. 7,326 ft.

North Pettus—Goliad-Karnes Counties

Diamond Halff Oil Co. No. 1-C Gillette, 745-ac. tr., J. Gomez Sur. Sd. 3,668-3,876 ft.; completing.

Jane Oil Co. No. 6 Smith, B.&B. Sur. No. 25. T.D. 3,727 ft.; set 5½-in. csg. 3,712 ft.; comp.; 65 B.P.D.

Magnolia Pet. Co. No. 13 Porter, 330 ft. SE line lse., 660 ft. NE of No. 6, B.&B. Sur. 23. Tstd. oily mud 3,718-32 ft.

Clark—Guadalupe County

Diamond Halff Oil Co. No. 2 Larison, G. DeWitt Sur. Spudded.

Kenedy & Crowley No. 1 Johns, Davis Sur. T.D. 2,507 ft.; completing.

D. Mulholland No. 1 Johns, J. K. Davis Sur. Spudded.

Darst Creek—Guadalupe County

J. E. Clark No. 1 Anderson, 8 mi. W of Seguin. Drlg. 326 ft.

Diamond Halff Oil Co. No. 1 Bibbs, Robinson Sur. Top Edwards 2,852 ft.; drlg. 3,477 ft.

Freeman Oil Co. No. 3 Larrison, G. DeWitt Sur. Set csg. 2,450 ft.; W.O.C.

Riddle Oil Co. No. 1 Williams, G. DeWitt Sur. R.U.

Saxet Prod. Co. No. 1 Wilson, G. Dewitt Sur. No. 13. Drlg. plugs in chalk.

V. G. Schimmel No. 2 Grimm, Dewitt Sur. T.D. 2,525 ft.; set csg. 2,383 ft.; W.O.C.

T. Staats No. 1 Wilson, G. DeWitt Sur. Set sur. csg.; W.O.C.

Watson No. 1 DeLancey, 400-ac. tr. Cg. 2,556 ft.

Nolte—Guadalupe County

Riddle Oil Co. No. 1 Herff, Gortari Sur. No. 76. Drlg. 2,027 ft.

Riddle Oil Co. No. 2 Nolte, Lowell Sur. 16. Drlg. 1,085 ft.

Wheelock & Collins No. 1 Warnecke, 335-ac. tr. R.U.

Sal Mar—Guadalupe County

Perot Oil Corp. No. 1 Priestly, Williams Sur. 46. Sat. chalk 2,006½-9 ft.; comp. on pmp.; no gauge.

LaBlanca—Hidalgo County

Gulf States Oil Co. No. 3 Engleman, Lot 3, Blk. 70, Las Mestanas Gr. (workover). T.D. 8,123 ft.; set csg. on bottom; perf. 8,016-21 ft. and 8,024-34 ft.; no shows; rocking with gas.

Sterling O. & R. Co. No. 1 Engleman, 660 ft. N and E lines, Lot 8, Blk. 95. Set sur. csg. 1,250 ft.; drlg. sh. 7,271 ft.

Mercedes—Hidalgo County

Union Sulphur Co. No. 7 American Rio Grande, Tr. 2,309, Blk. 59, (workover), perf. csg. 7,481-91 ft.; P.B. 7,592 to 7,513 ft.

Samfordyce—Hidalgo-Starr Counties

Cosmo Petroleum Co. No. 1 Guerra, Sh. 254, Porc. 40. Drlg. 570 ft.

Ralph Fan No. 3 Flores, Sh. 250, Porc. 38. Sd. 3,064-74 ft.; perf. csg. set at 2,986 ft.

Harrison & Danvers, Inc., No. 1 Pena, 16.5-ac. tr., Tr. 250, Porc. 38. Cg. 2,943 ft.

Henshaw Bros. No. 1 Elizando, Porc. 39. Sd. 3,678-82 ft.; S.G.; set csg. 3,110 ft.; perf. 3,064-74 ft.

Val-Tex Oil Co. No. 2 Chapa, Tr. 250, Porc. 39. Set csg.; T.D. 3,008 ft.; perf. 2,944-46 ft.; washing in.

Young & Bonnear No. 1 Diaz, Tr. 331, Porc. 40. Drlg. 1,200 ft.

Alworth—Jim Hogg County

French Oil Co. No. 2 Garza, Blk. 1, Sur. 269. Sd. 1,033-35 ft.; set csg.; S.G.

Randado—Jim Hogg County

J. W. Adams No. 1 Allen, B.G.&F. Sur. 41. T.D. 1,490 ft.; D.&A.

Benionville—Jim Wells County

Tom Graham No. 2 Luby, Share 4, Los Presnos de Abajo Gr. Perf. 5,423-33 ft.; rng. screen.

LaJita Co. No. 3 Pope, sec. 20. Loc.

Stanolind O. & G. Co. No. 1 Bird, de la Garcia Gr. Set csg. 5,835 ft.; P.B. 4,048-74 ft.; comp.; gasser.

Stanolind O. & G. Co. No. 2 Pope, sec. 11, King Farm Lots. Sd. 5,688-93 ft.; P.B. and comp.; gasser.

West Premont—Jim Wells County

Diamond Halff Oil Co. No. 1 Peterson, Lots 104 and 105, sec. 76. T.D. 2,250 ft.; set csg.; W.O.C.

C. G. Glasscock No. 1 Ritter, Lot 45, Haldeman Subd., sec. 76. D.&A. 2,351 ft.

Gouger & Mode No. 1 Bennett, Lots 55 and 58, Haldeman Subd., sec. 76. R.U.

Tom Graham No. 3-A Bennett, C Lots 72 and 73, sec. 76. Set csg. on sd. 2,266 ft.; perf. 2,260-65 ft.; comp.; 119 B.P.D. on 3/16-in. ck.; T.D. 2,266 ft.

Tom Graham No. 4-A Bennett, Lots 56 and 57, sec. 76. Cg. 2,237 ft.

Tom Graham No. 1 Laughlin, sec. 76. Sd. 2,257-69 ft.; perf. 2,257-65 ft.; compg.

Graham & Gilcrease No. 2 Laughlin, Trs. 7 and 10, sec. 76, Sur. 231. T.D. 2,257 ft.; comp.; no gauge.

Graham and Gilcrease Oil Co. No. 1-C Bennett, Lots 89 and 90, Haldeman Subd., sec. 76. Loc.

Graham and Gilcrease Oil Co. No. 2 Lee Ligson, Lots 97 and 112, Haldeman Subd., sec. 77. Sd. 2,249-57 ft.; comp.; no gauge.

Richardson, Ware & Richardson No. 1 Miller, cen. Lots 40 and 41, Holdeman Subd., sec. 71. Drk.

Securities Royalty Co. No. 1 Miller, Lots 40 and 41, sec. 231. Sd. 2,330-66 ft.; set csg.; W.O.C.

S. J. Sloan No. 1 Nash, Lot 102, Holdeman Subd., sec. 75. Set csg. 2,350 ft.; T.D. 2,355 ft.; completing.

Sandia—Jim Wells County

O. W. Killam No. 1-B Wade, Lopez de Jean Gr. R.U.

J. E. Walsh No. 2 Wade, Lot 2, Blk. C, Bode Subd. Stdg. 2,875 ft.; prep. resume drlg.

Kingsville—Kleberg County

Great States Oil Co. No. 1 Kivlin, Blk. 4, sec. 39. S.D. 2,485 ft.

Humble O. & R. Co. No. 9 Kleberg, Lot 2 sec. 40. M.I.M.

Oakville—Live Oak County

Simmons O. & G. Co. No. 2-B Reagan Hrs., 451-ac. tr. T.D. 2,809½ ft.; comp.; west gasser at 2,797-2,809½ ft.

Calliham—McMullen County

R. P. Lightfoot No. 9 Lark, Blk. 118, Scrugham Sur. Loc.

Loma Oil Co. No. 3 B. Jacob, O'Boyle Sur. D.&A. 1,075 ft.

National Pet. Co. No. 5-B Lark, O'Boyle Sur. Comp. 12 B.P.D.; sd. 929-32 ft.

Ina—Medina County

Ina O. & R. Co. No. 3 Viola Wilson, Durst Sur. S.D. 742 ft.

Agua Dulce—Nueces County

Stoddart & Moss No. 1 Colman, 330 ft. NW and NE lines, SE¼ SW 330-ac. tr., sec. 206, S.D. 6,885 ft.; blew out and closed in; to attempt comp. through drill stem; S.D.

Texon Drlg. Co. No. 2-B Sevier, 330-ac. tr., W. W. Chapman Lds., Palto Alto Gr. Set 16-in. csg. 300 ft.; drlg. 6,013 ft.

United Prod. Co. No. 1 Harvey, 1,100 ft. W line, 1,050 ft. N line, tr., M. Garza Sur. Drlg. 6,921 ft.

J. P. Walker et al No. 2 Ingram, Blk. 8, sec. 6, Ross Peters Subd. R.U.

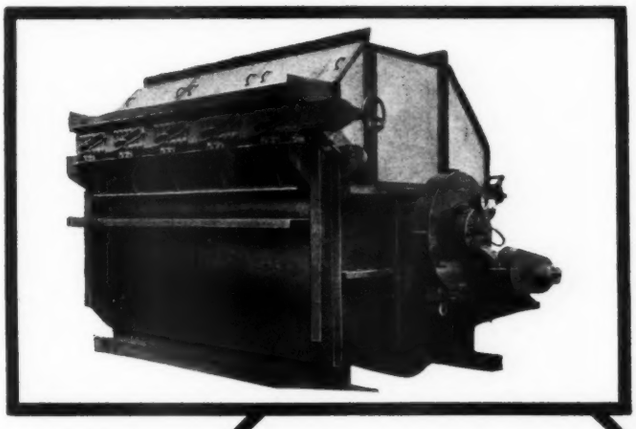
Chapman Ranch—Nueces County

Seaboard & Allen No. 1-B Chapman, 1,980 ft. N line, 660 ft. W line, sec. 37. R.U.

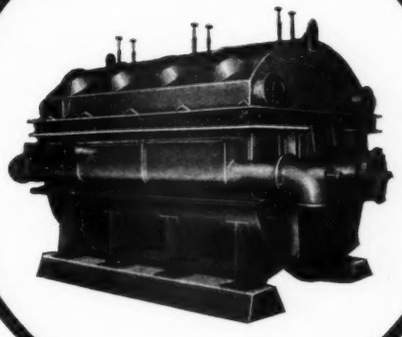
Seaboard & Allen No. 3 Chapman, 1,650 ft. W line, 330 ft. S line, sec. 38. Loc.

30 YEARS EXPERIENCE

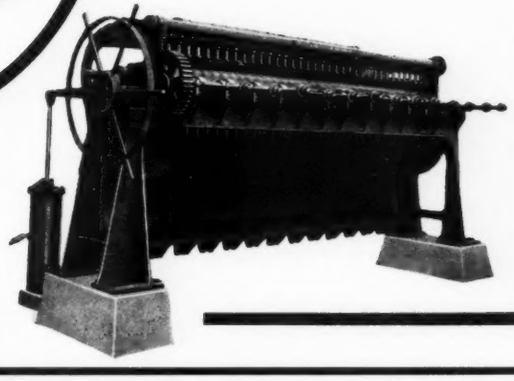
. . . combined with the Latest Ideas and Equipment for Oil Filtration



Oliver Precoat Vacuum Filter (hooded type) which operates with a filter aid and continuously presents a new surface for deposition. It is especially efficient in handling colloidal solutions difficult to filter.



Oliver Continuous Vacuum Filter—an entirely automatic unit for use on a continuous process, particularly in dewaxing.



Sweetland Pressure Filter, hundreds of which are in service in refineries on contact work. This is the process industry's pressure filter for general service.

These thirty years of filtration experience, covering *all* the process industries, including oil refining, form the background of Oliver United's service on filtration problems.

Equally important is the variety of filters available, each type differing in its design, construction and operation to suit the requirements of the field in which it is employed. Oliver United's policy is to develop a new filter when an existing type cannot be efficiently applied. The Oliver Precoat filter, illustrated at the top, is an example of one of our recently developed filters to meet requirements for efficient clarification.

A third factor that should not be overlooked is experience in manufacturing the filters.

At each of the three offices listed below are engineers who know filtration or separation problems in oil refineries. Call on their wide experience for the solving of yours.

OLIVER UNITED FILTERS INC.

33 West 42nd St. New York, N. Y.

221 N. LaSalle St. Chicago, Ill.

351 California St. San Francisco, Calif.

Clara Driscoll—Nueces County

Houston Oil Co. No. 1 Sevier, 330 ft. S and W lines, 77.1-ac. tr., Quadrilla Irr. Co., Sur. Loc.

Magnolia Pet. Co. No. 2 Sevier, 330 ft. S and W lines, 80-ac. tr., R. Russell Sur. Sd. 4,490-96 ft.; S.W.; drlg. 4,534 ft.

Texas Co. No. 1 C. D. Sevier, Wm. Gambel Sur. Cg. 5,435 ft.

Wellington Oil Co. No. 14 Sevier, 254.7-ac. tr., Wm. Gambel Sur. No report.

Flour Bluff—Nueces County

Humble O. & R. Co. et. al. No. 1 Gulden, Lot 30, Blk. 47. Flwg. in pits; T.D. 6,665 ft.

Humble O. & R. Co. et al No. 2-A Miller, Lot 20, Blk. 56. Drlg. sh. 5,456 ft.

Humble O. & R. Co. No. 2-B Miller, Blk. 21, sec. 48. Prep. test; T.D. 6,657 ft.

Humble O. & R. Co. et al No. 3-B Miller, Lot 4, Blk. 48. Drlg. 6,359 ft.

Humble O. & R. Co. et al No. 7 Phillips, Blk. 14, sec. 55. Drlg. sh. 5,334 ft.

Humble O. & R. Co. et al No. 1 Ritter, Lot 25, Blk. 55. Set csg. 6,648 ft.; W.O.C.

Humble O. & R. Co. et al. No. 1-A Solar Sevier, Blk. 13, sec. 47. D.S. tstg. 6,656 ft.

S. Paul No. 1 Moulter, Blk. 16, sec. 41, Encinal Garden tracts. Loc.

Saxet Heights—Nueces County

W. C. Brady No. 1 Guy. C Lot 45, Country Club Addn. Sd. 4,039-83 ft.; set csg.; comp.; 75 B.P.D. on 3/16-in. ck.

Ben F. Smith No. 1 Snowden, 13-ac. tr., Villareal Sur. R.U.

Taylor Pet. Co. No. 7 Country Club, 88-ac. tr., Villareal Sur. Drlg. 7,316 ft.

Saxet—Nueces County

C. Andrade & Renwar Oil Co. No. 7 Frank, Sur. 416. T.D. 5,821 ft.; set csg.; perf. 5,814½-17 ft.; comp.; 128 B.P.D. on ⅛-in. ck.; T.D. 5,821 ft.

Benson Drlg. Co. No. 1 Morgan, 330 ft. N and W lines, 40-ac. tr., Sur. 315 (W.O.). Old T.D. 4,483 ft.; R.U. to D.D.

Dentex Oil Co. No. 5 Harmon, 330 ft. S and W line, 50-ac. tr., Sur. 416. Drlg. 4,257 ft.

R. B. Bryant No. 6 Frank, Sur. 416. Drlg. 3,047 ft.

Conservative Oil Co. No. 1-A R. Morgan, 80-ac. tr., Sur. 315. Set csg. on sd. 4,451-54 ft.; sdtrk. hole.

Conservative Oil Co. No. 3-B Morgan, Sur. 403. Oil sd. 6,914-28 ft.; set csg. 6,928 ft.; drlg. plugs.

A. D. Corgey No. 1 Page, 330 ft. S and E lines, 20-ac. tr., Sur. 716. Drlg. 2,562 ft.

Crown Central Pet. Corp. No. 6-A Morgan, Sur. 315. Sd. 4,445-50 ft.; comp.; 131 B.P.D. on 3/16-in. ck.; T.D. 4,450 ft.

Donico Prod. Co. No. 2 Dounigan, 330 ft. W line, 2,004 ft. S line, 80-ac. tr., sec. 7, Rge. 6, Kinney Lds. Cg. 4,542 ft.

L. Glasscock No. 2 Johns, 20-ac. tr., MacGregor Sur. 582. M.I.M.

L. Glasscock No. 3 Hunter, 990 ft. N line, 330 ft. W line, 160-ac. tr., Dunn Sur. 312. Blew out; shut in; cg. 6,931 ft.

Great States Oil Co. and Violet Oil Corp No. 7 McGregor-Belk, Sur. 311, D.S.T. 6,318-26 ft.; recd. 1,000 ft. oil, 90 ft. S.W.; sd. 6,208-26 ft.; set csg. 6,326 ft.; cleaning into pits.

W. H. Harrison Drlg. Co. No. 1 Taggert, 50-ac. tr., Sur. 401. Cg. 3,683 ft.

Hiawatha Oil Co. No. 8 Hutchins-Stillwell, Lot 30, Sheppard Farm Lds. R.U.

Hiawatha Oil Co. No. 9 Hutchins-Stillwell, Lot 34, Sheppard Lds. Sd. 5,833-47 ft. S. O.; recementing perf. at 5,833½-45½ ft.

Houston Oil Co. No. 2 fee, Sur. 582. R.U.

Houston Oil Co. No. 12 McGregor, 135-ac. tr., Sur. 582. T.D. 5,826 ft.; comp.; no gauge.

Houston Oil Co. No. 19 Morgan, 493.63-ac. tr., sec. 7, Rge. 5. Set csg. 4,425 ft.; W.O.C.

Houston Oil Co. No. 20 Morgan, 493.63-ac. tr., sec. 7, Rge. 5. Set csg. 4,426 ft.; W.O.C.

H. H. Howell No. 3 Hutchins, 80-ac. tr., Sur. 416. Drlg. 3,816 ft.

H. H. Howell No. 1 R. Morgan, Blk. 3 Roberts Subd., Sur. 415. Sat. sd. 6,735-42 ft.; set csg.; perf. 6,726-30 ft.; completing.

Maryland Corp. No. 6 Morgan, Sur. 593. Perf. csg. 4,422-26 ft.; swbg.

Mills Bennett Prod. No. 4 Kassner, 120-ac. tr., sec. 409. Spdg.

Mills Bennett Prod. Co. No. 2 Ordnar, 210-ac. tr., Sur. 410 (W.O.). T.D. 4,227 ft.; set csg. 4,133 ft.; comp.; no gauge.

Morgan & Chapman Minerals No. 6 Morgan Clark, NE¼, Sur. 405. Cg. 7,162 ft.

North Star Oil Co. No. 7 R. Morgan, W½ SE¼, Sur. 405 (workover). O.T.D. 5,835 ft.; to D.D. to 8,000 ft.; sd. 6,747½-64 ft.; set csg. 6,764 ft.; comp.; 132 B.P.D. at 6,754½ ft. on ⅛-in. ck.

Pan American Prod. Co. No. 8-A Morgan, 89-ac. tr., Sur. 403. Sd. 5,823-27 ft.; set csg. 5,827 ft.; fsg. for swb.

Pan American Prod. Co. No. 5-A Sagarin, 89-ac. tr., Sur. 403. Sd. 5,802-19 ft.; set csg.; completing.

Pan American Prod. Co. No. 4 Solar Sevier, 40-ac. tr., Sur. 582. Sd. 6,235-73 ft.; set csg. 6,273 ft.; comp.; no gauge.

Perry & Reed No. 1 fee, 30.4-ac. tr., Villareal Gr. Set sur. csg.; W.O.C.

Phillips Pet. Co. No. 5 Hutchins, 60-ac. tr., Blks. 29 and 30, Sheppard Farm Lots. (W.O.); oil sd. 6,891-6,901 ft.; perf. 6,893-99 ft.; cleaning in pits.

Port Oil & Gas Co. No. 1 Cox & Cryder, 72-ac. tr., Gallagher Sur. 166. Sd. 3,181-86 ft.; comp.; 250 B.P.D. on ¼-in. ck.

Republic Nat. Gas Co. No. 4-A Donigan, 240-ac. tr., secs. 6 and 7, Rge. 6. T.D. 4,629 ft.; perf. 4,228-35 ft.; comp.; dry gasser; S.I.C.P. 1,300 lbs.

Republic Nat. Gas Co. No. 18 Dunn, 57.7-ac. tr., Blk. 38, Sheppard Farm Lots Sd. 6,862-68 ft.; set csg.; W.O.C.

Republic Nat. Gas Co. No. 2 Hutchins, 60-ac. tr., sec. 9, Rge. 5. Tstd. S.W. 4,833-70 ft.; set csg.; comp.; 104 B.P.D. on 5/16-in. ck.; perf. at 4,055 ft.

Republic Nat. Gas Co. No. 3-A Morgan, sec. 405. Drlg. 1,780 ft.

Richardson Pet. Co. No. 8 Cain & Secrist, 440-ac. tr., Russell Farm Lot 23. T.D. 4,100 ft.; sdtrkd.; drlg. 4,371 ft.

Richardson Pet. Co. No. 10 Cain & Secrist, Blk. 23, Russell Farms. Drlg. 4,026 ft.

Richardson Pet. Co. No. 1 Erwin, 5.8-ac. tr., Sur. 500. R.U.

Richardson Pet. Co. No. 7 Quiros, Blk. 40, Sheppard Farm Lots. Sd. 5,796-5,832 ft.; set csg. 5,832 ft.; drld. plugs; completing.

Richardson Pet. Co. No. 9 Quiros, Blk. 36, Sheppard Lots. Drlg. 5,026 ft.

Richardson Pet. Co. No. 4 Sedwick, 185.4-ac. tr., Sur. 586. Set csg. 4,860 ft.; sd. 4,854-60 ft.; comp.; 299 B.P.D. on 3/16-in. ck.

Southern Minerals Corp. No. 20 Bliss, 120-ac. tr., Sur. 416. Drlg.

Southern Minerals Corp. No. 5 Mastin, Sur. 416. Sd. 6,887-97 ft.; D.S.T. at 6,882-97 ft.; rec. 60 ft. dist. at 300 lbs.; W.P. in 5 min.; cg. ahead.

Southern Minerals Corp. No. 13 Smith, Blk 4, Sheppard tra. Set sur. csg.; W.O.C.

Texon Drlg. Co. No. 5 Vance, Thos. Gallaugher Sur. Cg. 6,467 ft.

Stratton—Nueces County

Camp Prod. Co. No. 1 Wordner, 330 ft. E line, 1,280 ft. N line, sec. 12, Stratton Subd. Drlg. 5,145 ft.

Sullivan—Nueces County

Invincible Oil Co. No. 1-B Elliff, 406 ft. S and W lines, 160-ac. tr., Longorio Gr. R.U.

Plymouth—San Patricio County

Magnolia Pet. Co. No. 12 C. C. Bank, 466 ft. N and E lines, Fessenden Sur. Drk.

Plymouth Oil Co. No. 65-C Welder, sec. 71 T.D. 6,900 ft.; stdg.

Plymouth Oil Co. No. 68-C Welder, sec. 71. Oil sd. 5,628-44 ft.; set csg.; comp.; 188 B.P.D. on 9/64-in. ck.

Plymouth Oil Co. No. 70-C Welder, sec. 71. Drlg. 5,534 ft.

Plymouth Oil Co. No. 72-C Welder, 3,411 ft. S line, 797 ft. E line, sec. 71. Set sur. csg. 350 ft.; W.O.C.

Stanolind O. & G. Co. No. 2 C. C. Banks, sec. 24, Fourth Addn. Drlg. 4,026 ft.

Taft Field—San Patricio County

Atlantic Ref. Co. No. 2 Pullin, 40 ac. tr., sec. 1, Second Addn. O.W.W.O.; old T.D. 4,931 ft.; P.B. 4,010 ft.; comp.; 96 B.P.D. on ⅛-in. ck.

Cage Prod. Co. No. 6 Mayo, Ottman Sur. Comp.; 26 B.P.D. on 3/16-in. ck.; T.D. 4,920 ft.

Cage Prod. Co. No. 7 Mayo, 9,560 ft. W line, 990 ft. S line, 60-ac. tr., Ottman Sur. Loc.

Conroe Drlg. Co. No. 8 Pullin, 40-ac. tr., Wm. Burus Sur. Sd. 4,355-66 ft.; tstg.

Esues Oil Co. No. 4 Britton, Lot 8, sec. 6, Third Addn. Set csg. 4,008 ft.; completing.

Esues Oil Co. No. 6 Britton, Lot 8, sec. 6, Second Addn. Sd. 4,912-17 ft.; rng. csg.

Humble O. & R. Co. No. 1 Blaschke & Mayo, Lot 8, sec. 25. Drlg. sh. 2,893 ft.

Humble O. & R. Co. No. 3 Flynn, sec. 1, Second Addn. Set csg. 4,989 ft.; perf. 3,980-85 ft.; comp.; 7 B.P.H. on 5/32-in. ck.; T.D. 3,990 ft.

Humble O. & R. Co. No. 17 Mayo, Ottman Sur. T.D. sd. 4,923 ft.; rng. csg.

Ricaby—Starr County

Moss & Heard No. 3 Ricaby, Porc. 83, J. of Camargo. Drlg. 1,617 ft.

Barbacoas—Starr County

K. E. Merren et al No. 1 S.C.C.C., Blk. 34, Porc. 89. Drlg. sdy. sh. 3,793 ft.

Los Olmos—Starr County

H. C. Owens No. 1 Ivey, Porc. 87. R.U.

St. Marys O. & G. Co. No. 1 Seabury, Porc. 87. Drlg. 432 ft.

Ted Stone No. 1 Kelsey-Bass, Porc. 87 of Camargo. Set 6-in. csg. 393 ft.; S.D.

Rio Grande City—Starr County

Clopton & Reed No. 1 Green, Porc. 80. Drlg. sd. 4,026 ft.

Clopton & Reed No. 4 Tijerina, Lot 12, Sh. 14-C, Porc. 80. Drlg. 1,129 ft.

Aviator—Webb County

Joe Palmer No. 1 Garcia, Sur. 463. R.U.

Cole—Webb County

Cole Pet. Co. No. 99 Benavides, Blk. 10, Sur. 412. Drlg. 1,745 ft.

O. W. Killam No. 49 Bruni, Blk. 5, Sur. 3. T.D. 2,958 ft., tested oil.

O'Hern—Webb County

Hamil & Smith No. 4-A Benavides, Sur. 585. Drlg. 846 ft.

Hamil & Smith No. 22 Benavides, Blk. 504. Csg. 2,941 ft.; comp.; 240 B.P.D.; T.D. 2,947 ft.

Hamil & Smith No. 28 Benavides, Blk. 498, Hale Subd. Set csg. 2,941 ft.; comp.; 150 B.P.D.; jetting.

Hamil & Smith No. 29 Benavides, Blk. 497, Hale Subd. Cg. 2,932 ft.

O. W. Killam No. 50 Bruni, C Blk. 10, Sur. 8. Drlg. 477 ft.

Magnolia Pet. Co. No. 22 S. Benavides, Blk. 5, O'Hern & Seacord Subd. Drlg. 2,906 ft.

J. J. O'Hern No. 1-C Benavides, Hale Subd. Drlg. 177 ft.

H. M. Reed No. 4 Benavides, Blk. 299, Hale Subd. Swbg. 2,916 ft.

Starr Dev. Co. No. 1 Benavides, 330 ft. N and W lines, Sur. 173. M.I.M.

Sun Oil Co. No. 5-A Benavides, Blk. 508. Set csg. 2,531 ft.; W.O.C.

Sun Oil Co. No. 7-A Benavides, Blk. 455. Comp.; 8 B.P.H.; T.D. 2,950 ft.

Sun Oil Co. No. 8-A Benavides, Blk. 507. Sd. 2,941-50 ft.; comp.; 192 B.P.D.

Texas Co. No. 5-A Benavides, Blk. 375. Comptg.; T.D. 2,913 ft.

LaSal Vieja—Willacy County

Shell Pet. Corp. No. 1 Yturria, sh. 64, Carricitos Gr.; (W.O.). Drlg. 7,712 ft.

Charco Redondo—Zapata County

W. C. Bob No. 2 Martinez, S¼, Blk. 22, Quandudo Grant. Sd. 670-72 ft.; set csg.; W.O.C.

Cuellar—Zapata County

Magnolia Pet. Co. No. 4 Cuellar, Sur. 245. Drlg. 1,596 ft.

Escobas—Zapata County

Allied O. & G. Co. No. 6 Santos, Sh. 6, Fansler Part. Loc.

J. H. Clopton No. 1 Bustamente, Sh. 35, Fansler Part. T.D. 2,052 ft.; D.&A.

Texas Co. No. 97 Jennings, Cerrito Blanco Gr. Drlg. sh. 565 ft.

Haynes—Zapata County

D. Long No. 1 Phelps, Villa Gr. R.U.

Magnolia Pet. Co. No. 26 Haynes, Blk. 7, Haynes Subd. Set csg. 1,168 ft.; comp.; 40 B.P.D.

Magnolia Pet. Co. No. 23 Haynes, Blk. 7, Haynes Subd. Drlg. 597 ft.

Magnolia Pet. Co. No. 27 Haynes, Blk. 7, Haynes Subd. Comp.; 60 B.P.D.; T.D. 1,178 ft.

Valley Osage Oil Co. No. 10 Haynes, Blk. 14. Comp.; 25 B.P.D.; T.D. 1,103 ft.

Valley Osage Oil Co. No. 13 Haynes, Blk. 14, Haynes Subd. Comp.; 30 B.P.D.; T.D. 1,164 ft.

Valley Osage Oil Co. No. 15 Haynes, Blk. 14, Haynes Subd. T.D. 1,169 ft.; comp.; 57 B.P.D.

Valley Osage Oil Co. No. 18 Haynes, Blk. 14, Haynes Subd. Comp.; 30 B.P.D.; T.D. 1,125 ft.

Lopena—Zapata County

Dalport Oil Corp. No. 1 Vela, Porc. 20. Loc.

Venture Pet. Co. No. 2 Ramerez, Blk. 3, Porc. 18. Loc.

Wm. H. Winn No. 1 Carlos Vela, Blk. 6, Porc. 20. Set csg. 2,370 ft.; comp.; 40,000,000 ft. gas; T.D. 2,356 ft.

E. C. TEXAS WILDCATS

Anderson County

American Liberty Oil Co. No. 1 G. E. Gauge, Blackfoot area, B. Gilbert Sur. Drlg. 6,733 ft.

Tide Water Oil Co. et al No. 7 Monnig, S. Sanchez Sur., deep test, Long Lake field. Drlg. 8,114 ft.

Angelina County

Ginter & Brown No. 2 Cope heirs, Jose Morin Sur., 3 mi. E of Dibol. R.U.

Hicks et al No. 1 Morris, J. Morris Sur., 3 mi. E of Dibol. S.D. 2,167 ft.; pipe stuck.

B. F. Hoffman No. 1 So. Pine Lbr. Co., B. J. Thompson Sur., C of SE¼ of Blk. 11, NE of Dibol. S.D. 2,064 ft.

G. T. Van-Hull No. 1 W. D. Ivy, 10-ac. tr., W. D. Welch Sur., E of Dibol. S.D. 1,500 ft.

Cherokee County

J. G. Mayo No. 1 J. T. Greenwood, 330 ft. S and E of 22½-ac. tr. in C. Parks Sur. No. 295, 4½ mi. W of Lone Star. M.I.R.

A. F. Richardson No. 1 F. P. O'Brien, G. S. Clapp Sur., 3 mi. NW of Rusk; 5,000-ft. test. Loc.

Dallas County

Mauldin Oil Co. No. 1 W. E. Howell, S. Layton Sur., 8 mi. E of Grapevine, 6 mi. W of Longmire. S.D.

Falls County

A. H. Bell et al No. 1 C. L. Trice, F. Mayham Sur., 1 mi. E of Lott. S.D. 1,220 ft.;

Thirteen Oil Co. No. 1 H. R. Roberts, N. Slatter Sur., 6 mi. SE of Lott, Pecan Gap 1,480 ft.; S.D. 2,143 ft.

Fannin County

Joiner & Owens No. 1 Goss-Morgan, J. Stephens Sur., 16 mi. N of Honey Grove. S.D. 2,810 ft.

Freestone County

C. F. Lytle No. 1 R. Simmons, 170 ft. S and 510 ft. E of 23-ac. tr., R. B. Loughbotham Sur., 1 mi. S of Wortham. Loc.

Stroude et al No. 1 F. Mullens, 150 ft. S and 84 ft. E of R. D. Sloan Sur., 6 mi. NE of Fairfield. Loc.

Henderson County

Tide Water et al No. 1 McElreath & Suggett, Austin 3,710-4,110 ft.; top Woodbine 4,137 ft.; drlg. 4,700 ft.

Hunt County

Penn Oil Corp. No. 1 R. B. Parish, C 100-ac. tr., N. Dauley Sur., 7 mi. NE of Lone Oak. Drk.

Texola Land Corp. No 1. J. M. Goin, Jas. Merrick Sur., 2 mi. SW of Wolfe City. S.D. 40 ft.

Kaufman County

Scott & Woodside No. 1 W. and T. Nash, in J. Cortez Sur., 1 mi. E of Scurry. M.I.R.

Lamar County

Lowery-Cutler No. 1 E. C. Porter, Thos. King Sur. Top Georgetown 354 ft.; S.D. 1,647 ft.

Limestone County

A. W. Phillips et al No. 1 E. M. Speight, M. Herrin Sur., 6¼ mi. SE of Mexia. S.D. 3,695 ft.

Pure Oil Co. No. 16-T Kendrick, P. Varella Sur., Mexia field. S.D. 30 ft.

Red River County

Carpenter Oil Corp. No. 1 J. M. Roberts, J. Ware Sur., 10 mi. NE of Clarksville. Top Glenrose 2,765 ft.; S.D. 3,018 ft.

Roy I. Carter Drlg. Co. No. 1 J. A. Tutt, C 40-ac. tr. in D. Hart Sur., 2 mi. S of Avery. S.D. 1,180 ft.

Robertson County

J. E. Mills No. 1 T. Congelosi, G. A. Nixon Sur., 3½ mi. SW of Hearne. Loc.

Titus County

J. Z. Werby et al No. 1 Williams, 2 mi. E of Talco field, M.E.P.R.R. Sur. T.D. 6,219 ft.; pipe stuck.

Van Zandt County

Humble O. & R. Co. No. 1 L. K. Riggs, W. Daniels Sur. Deep test; R.U.

Stroud & Lowe No. 1 P. L. McNeill, J. W. Guest Sur., 4 mi. N of Ben Wheeler. Drlg. 200 ft.

Wood County

B. F. Phillips No. 1 L. E. Pritchard, C of N and S lines and 330 ft. W of 50-ac. tr., T. Craddock Sur., 4 mi. S of Winnsboro. R.U.

EAST TEXAS

(Border Counties)

Bowie County

Ferguson & Hill No. 1 Breckenridge, N. Dysas Sur. Drlg. 2,210 ft.

Sutton-Hawkins No. 1 McDuffey, John Ball Sur. Drlg. 3,722 ft.

Cass County

American Liberty No. 1 B. E. Echlos, H. Holbert Sur. Drlg. 1,900 ft.

Frank DeMayo No. 1 W. D. Chew, Robt. Trammel Sur. Tstg.; T.D. 6,010 ft.

Gulf Oil No. 4 Dawson, J. H. Rives Sur., NW cor. lse. Drlg. 5,383 ft.

Magnolia No. 3 Allday Est., P. Evans Sur. R.U.

Magnolia No. 11 J. E. George, John Collum Sur. Drk.

Magnolia No. 13 J. E. George, John Collum Sur. Loc.

Magnolia Pet. No. 3 W. M. Hall, Wilson Robinson Sur. Drk.

Magnolia No. 1 Hayer & Thatcher, Jacob Carsner Sur. Drlg. 350 ft.

Magnolia Pet. Co. No. 8 L. Haywood, P. Evans Sur., NE of No. 2. Comp.; 526 B. P.D.; T.D. 5,920 ft.

Magnolia No. 9 L. Haywood, P. Evans Sur., SE cor. 16-in. cmtd. 257 ft.; W.O.C.S.

Magnolia No. 10 L. Haywood, SW cor. lse., P. Evans Sur. Drk.

Magnolia No. 11 L. Haywood, SE cor. P. Evans Sur. Drk.

Magnolia Pet. Co. No. 2 Lewis and Wicks No. 2, Cass Co. Sch. Ld. Sur., NW cor. tr. Comp.; flw. 521 B.P.D.; T.D. 6,132 ft.

Magnolia Pet. Co. No. 3 Lewis and Wicks, Cass Co. Sch. Ld. Sur., E of No. 2. Comp.; flw. 496 B.P.D.; T.D. 6,150 ft.

Magnolia Pet. Co. No. 4 Lewis and Wicks, Cass Co. Sch. Ld. Sur. Tstg. 7-in. 6,078 ft.; T.D. 6,090 ft.

Magnolia Pet. Co. No. 5 Lewis and Wicks, Drlg. 6,020 ft.

Magnolia Pet. Co. No. 6 Lewis and Wicks, Alex Archer Sur. Comp.; flw. 577 B.P.D.; T.D. 6,037 ft.

Magnolia Pet. Co. No. 7 Lewis and Wicks, Alex Archer Sur. 7-in. cmtd. 5,985 ft.; T.D. 6,021 ft.

Magnolia Pet. Co. No. 8 Lewis & Wicks, Alex Archer Sur. 16-in. cmtd. 254 ft.; W.O.C.

Magnolia Pet. Co. No. 1 J. B. McLeod, Cass Co. Sch. Ld. Sur., NW cor. sur. Loc.

Magnolia Pet. Co. No. 3 Meda Green, J. Davenport Sur. Tstg. 7-in.; T.D. 5,990 ft.

Magnolia Pet. Co. No. 13 Meda Green, J. Davenport Sur. 7-in. cmtd. 6,043 ft.; T.D. 6,056 ft.

R. W. Norton No. 1 Davis, H. Holbert Sur. T.D. 6,022 ft.

R. W. Norton No. 2 Davis, H. Holbert Sur., NE cor. Drlg. 5,357 ft.

R. W. Norton No. 3 Davis, H. Holbert Sur. T.D. 5,366 ft.; D.S. stuck.

Ohio Oil Co. No. 13 R. P. Willis, S.F.I.W. Sur. No. 1,263. Drk.

Ohio Oil Co. No. 16 R. P. Willis, S.F.I.W. Sur. No. 1,263. Drlg. L. 4,150 ft.

Ohio Oil Co. No. 17 R. P. Willis, S.F.I.W. Sur. No. 1,263. Drlg. 2,056 ft.

Phillips Pet. Co. No. 5 Farrier, Wm. R Myers Sur. Comp.; flw. 462 B.P.D.; T.D. 6,150 ft.

Phillips Pet. Co. No. 7 Farrier, Wm. R Myers Sur. 7-in cmtd. 6,081 ft.; T.D. 6,085 ft.

Phillips Pet. Co. No. 8 Farrier, Wm. R. Myers Sur. Drlg. 5,330 ft.

Texas Co. No. 6 W. M. Hall, A. Archer Sur. Comp.; flw. 528 B.P.D.; T.D. 6,065 ft.

Texas Co. No. 7 W. M. Hall, Alex Archer Sur., NE cor. lse. Comp.; flw. 67 B.P.H.; T.D. 6,065 ft.

Texas Co. No. 8 W. M. Hall, Alex Archer Sur., NW cor. lse. 7-in. cmtd. 6,045 ft.; T.D. 6,079 ft.; W.O.C.S.

Texas Co. No. 8 McLeod, W. A. Elliott Sur. Drlg. 2,332 ft.

Texas Co. No. 2 N. A. Rambo, Cass Co. Sch. Ld. Sur. 9-in. cmtd. 2,218 ft.

Texas Co. No. 5 N. A. Rambo, Cass Co Sch. Ld. Sur. Drlg. 4,904 ft.

Texas Co. No. 7 N. A. Rambo, Cass Co. Sch. Ld. Sur. Drlg. 2,135 ft.

United Prod. Co. No. 2 Bivens Unit, Jas Davenport Sur. T.D. 6,021 ft.; S.D. W.O.

United Gas No. 3-A J. A. Blewey, H. Holbert Sur. Loc.

United Prod. No. 4 J. A. Bewley, H. Holbert Sur. 7-in. cmtd. 5,960 ft.; T.D. 6,000 ft.

United Prod. No. 2-A J. H. Bewley, H. Holbert Sur. Rng. 5-in.; T.D. 5,995 ft.

United Prod. No. 6 G. W. Bibby Unit, Alex Archer Sur. Drlg. 5,292 ft.
United Prod. Co. No. 1 Bostick, J. Coleman Sur. 7-in. 5,590 ft.; T.D. 5,684 ft.; W.O.C.S.
United Prod. No. 1 J. Q. Clements, Wm. B. Hughes Sur. Drlg. 5,786 ft.
United Prod. Co. No. 1 Davis Unit, Cass Co. Sch. Ld. Drlg. 6,052 ft.
United Gas No. 4 Bivens Unit, J. Davenport Sur. Drlg. 4,388 ft.
United Prod. Co. No. 1 J. W. Land, R. Potter Sur. Drlg. 6,186 ft.
United Prod. No. 1 R. O. Long, W. Robinson Sur. Drlg. 2,700 ft.
United Prod. Co. No. 1 J. D. Parker, J. Coleman Sur. Cg. 5,770 ft.
United Prod. No. 1 Terry Unit, R. Potter Sur. Drlg. 4,912 ft.
United Prod. No. 4 S. B. Willis, W. Robinson Sur. Drlg. 5,111 ft.
United Prod. No. 5 S. B. Willis, W. Robinson Sur. Drlg. 5,190 ft.
Vaughn Prod. Co. No. 1 Willis, S.F.I.W. Sur. 1,263. Drk.
Vaughn Prod. Co. No. 2 Willis, S.F.I.W. Sur. 1,263. 7-in. cmtd. 5,950 ft.; T.D. 5,968 ft.; fsg.

Harrison County

H. H. Alvord et al No. 1 M. A. Flannagan, L. Wormack Sur. T.D. 2,440 ft.; tstg.

Marion County

Arkansas-La. No. 1 W. S. Ford, Charles Grayson Sur., NE cor. Ford 204-ac. tr Acidized 7,000 gals.; flwg. and tstg.; T.D. 6,181 ft.
Arkansas-La. No. 1 Laura McIntosh, Edmondson Sur. Drlg. 5,500 ft.
Bauman, Dunn & Fischer No. 1 Chatten, A. D. S. Coy Sur., SE cor. Drlg. 5,431 ft.
Cemo Oil Co. No. 1 Lucas, A. Castleberry Sur., Caddo field. Drk.
Holcomb & Thomason No. 1 Lizzie Henderson, 330 ft. S and E, cor. Blk. 18, of Lizzie Henderson Subd., or 2,800 ft. S. 3,450 ft. E of NW cor. of R. Bennington Sur. Tstg. and W.O.; T.D. 5,996 ft.; avg. abt. 10 to 20 B.P.D.

Panola County

Danciger O. & R. No. 1 Tatum, A. Bissell Sur. M.I.M.
R. H. Dearing & Sons No. 1 Wooten Est., W. Mann Sur. M.I.M.
Matex Oil Co. No. 1 Thomas M. Alston 2 mi. E of Elysian field. Drlg. and cg. 5,240 ft.

Shelby County

Mulroy-Curtain et al No. 1 Hayden, D. G. Yordt Sur. T.D. 3,200 ft.; S.D.; W.O.; (cor.).
Wm. Redditt No. 1 Pickering Lbr. Co., SE cor. Stephens English Sur. S.D. 2,168 ft.; prep. D.D.
H. A. Stebbinger No. 1 Pickering Lbr. Co on 160-ac. tr. in A. Hanson Sur. 9-in. cmtd. 1,500 ft.; prep. to D.D.; T.D. 5,200 ft.

NORTH TEXAS WILDCATS

Archer County

Cargo Oil Co. No. 1 Slopansky, sec. 64, Harris Sur. Loc.
Tom Looney No. 1 J. S. Bridwell, W. B. Aldridge Sur. A-2. Drlg. 470 ft.
Pet. Prod. Co. No. 1 Turbeville D, R. Carson Sur. A-88. Drlg. 1,570 ft.
J. A. Self No. 1 Symank, sec. 11, L. & M. Pasture, 6⅝-in. 1,420 ft.; S.S.O. 1,421-25 ft.; S.D.O.
J. G. Steele No. 1 Andrews, R. Rainey Sur. A-354. Drlg. 600 ft.
Wilson & Ligon No. 1 Pearston, sec. 120, Harris Sur. Drlg. 1,250 ft.

Baylor County

W. J. Grisham No. 1 W. H. Portwood, T.E.&L. Sur. 1,279. Spudded.

Clay County

L. T. Burns No. 1 Sanzenbacker, L. N. Sparks Sur. A-401. Loc.
Green Mt. Oil Co. No. 1 Staggs, sec. 34 A.C.S.L. Sur. Spudded and S.D.
R. N. Hamilton No. 1 Fred Wines, sec. 4, H. Dixon Sur. A-106. S.D.O. 260 ft.

Cooke County

Denver P. & R. Co. No. 1 Solomon, W. G. Hunt Sur. A-493. Loc.
Peterson et al No. 1 J. M. Floyd, Chas DeMorse Sur. A-305. S.D.O. 870 ft.
Sparks & Russell No. 1 C. F. Bundy, P. P. Cary Sur. A-1,239. Spud. and S.D.

Denton County

Bolivar Drlg. Co. No. 1 Bentley, J. Yoakum Sur. A-1,443. Drlg. 1,270 ft.
Bolivar Drlg. Co. No. 1 J. P. Knox, R. Howard Sur. A-542. Gas sd. 1,950-55 ft. C.O. and tstg.
H. Culver No. 1 Waide, J. Chisum Sur. A-278. Loc.
J. C. Foster No. 1 Jeffcoat, J. West Sur S.D. 2,700 ft.
A. A. Lander, Inc., No. 1 Forrester, Jean Baroux Sur. A-45. Spudded.
Mullen & Weil, Inc., No. 1 D. G. Taylor, Linthicum Sur. A-1,600. Drlg. 1,472 ft.
Oil Finance No. 1 J. S. Gambill. Drlg. 1,895 ft.
Ruwaldt & Martin No. 1 Joe S. Gambill, J. B. January Sur. A-658. Drlg. 1,020 ft.

Grayson County

F. Gailbreath et al No. 1 Singletary, Chas Quillian Sur. A-989. P.B. 3,862-75 ft.; C.O. and testing; small show heavy oil.
North Texas Oil Co. No. 1 A. M. Smith, R. M. Williamson Sur. A-1,300. Drlg. 310 ft.
Olson et al No. 1 D. R. Ulteer, P. P. Cady Sur. A-301. Drlg. 5,105 ft.
Pete Shanor No. 1 Blair, H.L. 3,548-55 ft.; show heavy oil. Swabbing.

Jack County

L. T. Burns No. 1 M. N. Garrett, B.B.B.& C. Sur. A-100. Drlg. 270 ft.
Carpenter Oil Corp. No. 1 Johnson, R. Parker Sur. A-461. R.U.S.
Danciger O. & R. Co. No. 1 Kinder, B.S.&F. Sur. A-83. U.R. 7-in. 2,440 ft.
S. B. Edwards No. 1 Williams, J. M. Ross Sur. A-992. Drlg. 2,785 ft.
H. M. Leidecker No. 1 J. W. Padgett, E. Allbritton Sur. A-1,890. Derrick.
Sam Shabay No. 1 J. S. Callis, S.P.R.R. Sur. A-575. Spudded.
Tillman et al No. 1 Jones, J. Helmstutter Sur. No. A-1,269. Drk.

Montague County

Denver P. & R. Co. No. 1 Copeland, Blk. 162, Kembro Sur. Drlg. 3,975 ft.
Montague Oil Co., Inc., No. 1 W. J. Bell, sec. 2,882, T.E.&L. Sur. Fsg. csg. 4,000 ft.
Selby O. & G. Co. No. 1 J. M. Batts, M. B. Tatum Sur. A-740. Loc.
Ventex Investments, Ltd., No. 1 S. E. Bell, sec. 11, M.E.P.&P. Sur. S.D.O. 1,610 ft.

Wichita County

Christie et al No. 1 Vanmeter, Blk. 35, K.W.V.F.L. Sur. Drlg. 2,020 ft.
Leo Oil Co. No. 1 Fonville, sec. 323, Waggoner Co. Sur. R.U.R.
Petroleum Prod. Co. No. 73 First National Co., Blk. 29, K.W.V.F.L. Sur. 7-in. csg. cem. 3,671 ft.

Wilbarger County

Gibson & Jennings No. 1 Waggoner, sec. 109, H.&T.C. Sur., Blk. 14. Drlg. 1,272 ft.
F. A. Lain No. 1 J. Coffee, sec. 44, H.&T.C. Sur. O.W.D.D.; drk.
Peery Oil Co. No. 1 King, sec. 44, H.&T.C. Sur., Blk. 13. S.D.O. 2,160 ft.
L. Webb No. 1 Waggoner, sec. 49, H.&T.C. Sur., Blk. 2. L.S.O. 2,406-28 ft.; tested water; S.D.O.

Young County

Ambrose & Meyers No. 1 Brogden, T. C. Wadley Sur. A-2,309. Loc.
S. Caprito No. 1 Laquay, A. Irvin Sur. A-1,779. Drlg. 4,220 ft.
Collins & Fitzwater No. 1 J. G. Castleman, sec. 72, T.E.&L. Sur. Spudded.
J. E. Kadane No. 1 B. F. Manley, T.E.&L. Sur. 2,128. Drk.
D. P. Kenyon No. 1 J. W. Daws, T.E.&L. Sur. 752. Loc.
C. A. Lupton et al No. 1 Hall, B. R. Aiken Sur. A-2,241. Drk.
Pitzer & West & Lion No. 1 Mrs. F. Wray, T.E.&L. Sur. 3,411. R.U.R.
Pitzer & West No. 1 F. Wray, T.E.&L. Sur. 3,411. Drlg. 3,600 ft.
T. G. Shaw Oil Corp. No. 1 J. L. McLaren, Sec. 6, B.B.&C. Sur. 9-29. Loc.
A. T. Strong No. 1 M. K. Graham, T.E.&L. Sur. 3,410. Drlg. 1,087 ft.
R. H. Vise No. 1 Dollins, T.E.&L. Sur. 615. Drlg. 3,800 ft.
C. V. Welch No. 1 Street, M. E. Criswell Sur. A-1,772. Drlg. 2,370 ft.
Yorktex Pet. Co. No. 1 W. E. Steele, I.R.R. Sur. A-156. Fishing 1,600 ft.

WEST TEXAS WILDCATS

Andrews County

Botkins & Barron No. 1 Kemp. Loc.
M. S. Forgeron et al No. 1 Lockhart & Brown, C NE¼ sec. 20, Blk. A-41, P.S.L. Sur. Loc.
G. F. Getty, Inc., No. 1 R. H. Lindley, sec. 8, Blk. A-46. T.D. 4,642 ft.; retreated; testing.
Geo. F. Getty No. 1 Moxley. T.D. 4,802 ft. S.D. for orders.
Mannigan No. 1 Lotus Oil Co., sec. 18, Blk. A-48, P.S.L. Sur. Drlg. 3,875 ft.
R. H. Henderson No. 1 J. E. Parker, sec. 25, P.S.L. Sur. A-43. T.D. 4,555 ft.; testing.
Humble O. & R. Co. No. 1-B Means, sec. 11, Blk. A-45. Drlg. 4,450 ft.
Shell Pet. Corp. No. 1-E F. King, sec. 10, Blk. A-42, P.S.L. Sur. T.D. 4,486 ft.; averaged 107 bbls. per day for 3 days on pump.
Standard of Texas No. 1 Gray Estate, sec. 21, Blk. A-42, P.S.L. Sur. Cellar

Bailey County

E. L. Wilson et al No. 1 Blank, Labour 4, Abner Taylor League 700. Loc.

Brewster County

F. C. Dodson No. 1 Texas American Synd., sec. 66, Blk. 10, G.H.&S.A. Sur. Drlg. 3,942 ft.

Cochran County

Bond & Harrison No. 1 Dean, Labour 1, League 85, Greer Co. School Lands. Set csg. 200 ft.

Coke County

Plymouth Oil Co. No. 1 Mrs. Mary Hanna, sec. 252, Blk. LA, H.&T.C. Sur., 1½ mi. SW of Blackwell. Cellar.

Crane County

Clark et al No. 1 Jordan, sec. 12, Blk B-22, P.S.L. Sur. T.D. 3,750 ft.; testing on pump.
Gulf Oil Corp. No. 2 McKnight, sec. 9, Blk. B-21. Drlg. 4,370 ft.
Sinclair Prairie Oil Co. No. 1 University, sec. 13, Blk. 35. Drlg. 2,362 ft.

Crockett County

Choate & Hogan No. 1 C. B. Haun, sec. 88, Blk. 1, I.&G.N. Sur. Loc.
Superior Oil Co. of Calif. No. 1 J. S. Todd, C SE¼ sec. 55, Blk. UV, G.C.&S.F. Sur. T.D. 545 ft.; moving in rotary.

Ector County

Bond & Harrison No. 1 Rumsey, sec. 35, Blk. 45, Twp. 1n, T.&P. Sur. T.D. 4,154 ft.; testing.
Sinclair Prairie Oil Co. No. 2-A Johnson, sec. 48, Blk. 43, Twp. 1s, T.&P. Sur. T.D. 4,345 ft.; P.B. 4,173 ft.; to pump.

Edwards County

Dan Auld et al No. 1 Rigsby, sec. 16, Blk. OK, G.C.&S.F. Sur., 15 mi. NE of Rock Springs. Spudded.

Fisher County

L. A. Daniels et al No. 1 J. J. Nickless. T.D. 2,848 ft.; C.O.
Forrest Dev. Co. No. 1 J. A. Scott, sec. 105, Blk. 2, H.&T.C. Sur. Drlg. 2,132 ft.
Martin & Brubaker No. 1 Brown, W. E. Richardson Sur., sec. 4, Blk. R. S.D. 2,725 ft.; ran csg.
Southern Oil Co. No. 1 Robinson, sec. 172, Blk. 2, H.&T.C. Sur., 2½ mi. NE of Raton. Drlg. 2,900 ft.

Gaines County

A. G. Carter No. 1 A. L. Wasson et al, 2,310 ft. from S and 330 ft. from W, sec. 48, Blk. AX, P.S.L. Sur. Rig.
Landreth Prod. Co. No. 1 C. Cobb, sec. 20, Blk. A-21. Drlg. 4,370 ft.

Garza County

S. Caprito No. 1 Post Estate, sec. 230, Blk. 5, K. Aycock Sur. Fsg. 2,173 ft.

Glasscock County

Fleetborn Oil Co. No. 1 Black Arrow, sec. 3, Blk. 34, Twp. 3s, T.&P. Sur. Drlg. 2,727 ft.

Hockley County

Texas Co. No. 1 B. Slaughter, Labour 83, League 38, Zavala Co. Sch. Lds. Drlg. 4,767 ft.

Howard County

Moore Bros. No. 1 T.&P. Land Trust, sec. 33, Blk. 30, Twp. 1s, T.&P. Sur. Drlg. 280 ft.
Shasta Oil Co. No. 1 Cora Echols, sec. 5, Blk. 15, T.&P. Sur. R.U. machine.
R. A. Westbrook et al No. 1 G. T. West, sec. 48, Blk. 33, Twp. 1n, T.&P. Sur. S.D. 1,460 ft.; blowing air and salt water.

Hudspeth County

Haymon Krupp Oil & Ld Co. No. 1 Thaxton, SE¼ sec. 24, Blk. 74, Twp. 6. Drlg. 2,969 ft.

Jones County

Martin & Son No. 1 Hayden, Subd. 5, Lot 2, Martinez Sur. S.D. 2,547 ft.
J. L. Reeves No. 1 Kelly, C. Martinez Sur., 1½ mi. N of Hawley. T.D. 2,251 ft; P.B. 2,225 ft.
T. K. Simmons No. 1 E. A. Hicks, sec. 5, O. A. Lands Sur. Fsg. 2,100 ft.
Ungren & Frazier No. 1 J. J. Steele, sec. 11, Blk. 15, T.&P. Sur. T.D. 2,487 ft.; swabbing oil and water.

Loving County

Mason Oil Co. No. 3 Kyle, sec. 20, Blk. 55, Twp. 1, T.&P. Sur. S.D. 1,225 ft.
Stanolind O. & G. Co. No. 1 M. Kyle, sec. 20, Blk. 55, Twp. 1, T.&P. Sur. M.I.M.

Pecos County

Adams & Black No. 1 Masterson, sec. 71, Blk. 10, H.&G.N. Sur. Spd. and S.D.
Bahan & Rhodes No. 1-B Bonebrake, sec. 116, Blk. 8, H.&G.N. Sur. T.D. 2,290 ft.; C.O.
Hightower Oil Corp. No. 1 Holmes, sec. 6, Blk. C-3, E.L.R.R. Sur. S.D. 2,633 ft.
Humble O. & R. Co. No. 1 E. M. Gray, sec. 94, Blk. 11, G.H.&S.A. Sur.; 5,000-ft. test. Drlg. 1,763 ft.
Humble O. & R. Co. No. 1 Tippett, 3,705 ft. from S and 1,692 ft. from E of sec. 537, T.I.&M. Sur. Loc.
A. Kirk et al No. 1 Mrs. B. Young, sec. 49, Blk. 10, H.&G.N. Sur. Loc.
E. R. Minshall, No. 1 Banker, sec. 25, Blk. 146, T.&St.L. Sur. T.D. 3,005 ft.; swabbing water.
Pinerock Oil Co. No. 1 White & Baker, SE cor. sec. 5, Blk. 207, T.C. Sur. Drlg. 228 ft.
S. Thompson No. 1 Elsinore Cattle Co., sec. 54, Blk. D, G.C.&S.F. Sur. Drlg. 4,780 ft.
Trans-Pecos Oil Co. No. 1 Gallagher. T.D. 1,272 ft. Running csg.
Union Oil & Mining Co. No. 1-A Magnolia, sec. 5, Blk. 9, H.&G.N. Sur. S.D. 1,821 ft.
Young No. 1 Bailey, sec. 23, Blk. 178, T.C. R.R. Sur. Drlg. 2,100 ft.
Young No. 1 Perry. R.U.M.

Presidio County

L. C. Brite No. 4 fee, C NW¼ sec. 113, Blk. 12, G.H.&S.A. Sur. Drlg. 600 ft.
A. H. Main No. 1 Greenlee, sec. 40, Blk. 347, 13 mi. NE of Marfa. Drlg. 500 ft.

Reagan County

Bahan & Rhodes No. 1 Kloh, sec. 37, Blk. 37, Twp. 5s, T. & P. Sur., NW cor. of county. Drlg. 3,140 ft.
O. B. Greathouse No. 1 W. E. Friend, sec. 3, W. Allen Sur. Loc.

Reeves County

Grisham & Hunter No. 1 Montgomery, sec. 1, W.R. King Sur. Drlg. 3,010 ft.
J. C. Hill et al No. 1 Ely, sec. 38, Blk. 71, P.S.L. Sur. Cellar.

Schleicher County

J. M. Cooper No. 2 B. Page, sec. 40, Blk. L, G.H.&S.A. Sur. M.I.T.
Mangus Oil Co. No. 1 Judkins & Spencer, C SW¼ sec. 4, W. W. Russell, grantee. Elev. 3,209 ft.; T.D. 6,527 ft.; P.B. 5,912 ft.; shot 145 qts. from 5,814-5,920 ft.; C.O.

Scurry County

Bristow & Cantrell No. 1 Tomlinson, sec. 122, Blk. 97, H.&T.C. Sur. Drlg. 1,406 ft.
E. L. Goos No. 1 Henderson, sec. 148, Blk. 97, H.&T.C. Sur. Loc.

Upton County

Amerada Pet. Corp. No. 5 Lane, sec. 32, Blk. 1, M.K.&T. Sur. Drlg. 727 ft.

Ward County

Magnolia Pet. Co. No. 1-55 Sealy, sec. 55, Blk. F, G.M.M.B.&A. Sur. Drlg. 2,629 ft.
L. F. White et al No. 1 Rector-Monroe, E cor. sec. 3, Blk. 1, W.&N.W. Sur. Drlg. 1,033 ft.
Wood et al No. 1 Boogher, sec. 8, Blk. 32, H.&T.C. Sur. Drlg. 2,541 ft.

Winkler County

Richardson No. 1-B Walton, sec. 20, Blk. 77, P.S.L. Sur. Drlg. 1,457 ft.
J. R. Sharp No. 1 Walton, sec. 19, Blk. 77, P.S.L. Sur. T.D. 3,414 ft.; to shoot.
York & Harper et al No. 1 Gunter & Munson, sec. 7, Blk. C, G.M.M.B.&A. Sur. Drlg. 3,652 ft.

Yoakum County

Bahan et al No. 1 Shook Est., sec. 420, Blk. D, John H. Gibson Sur. Loc.
Magnolia Pet. Co. No. 1 Mrs. M. E. Taylor, sec. 201, Blk. D, John H. Gibson Sur. Cellar.

RANGER (CENTRAL TEXAS) DISTRICT

Brown County

R. M. Ragsdale et al No. 1 J. H. Taber, 10 mi. NE Thrifty, 1,320 ft. from N line and 150 ft. from W line, sec. 87, H.T.&B. Sur., Abst. 437. Loc.

Callahan County

Canyon O. & G. Co. No. 1 J. O. Kidd, R. A. Pennell Sur. No. 755, 4 mi. NW Cross Plains. Drlg. 625 ft.
A. R. Forster No. 1 C. B. Snyder, NW cor. NE¼ county, sec. 139, B.B.B.&C. Sur. Drlg. 825 ft.

Coleman County

Midfield Oil Co. No. 1 T. H. Ward, sec. 274, W. Echels Sur. S.D.O. 1,500 ft.

Eastland County

J. T. Anderson No. 1 Crist, 8 mi. N of Rising Star, sec. 36, Lavaca Co. Sch. Lds. Drlg. 250 ft.
J. A. Bearman et al No. 1 Mrs. R. L. Poe, S edge Cisco, 450 ft. from S and W of sec. 79, H.&T.C. Sur., Blk. 4. Bldg. drk.
Barnett Pet. Corp. No. 1 L. C. Downtain, 2 mi. SE Eastland, 1,000 ft. from E line and 1,250 ft. from S line of sec. 2, E.T. R.R. Sur., Blk. 6. Loc. for 2,500-ft. test.
F. J. Estes No. 1 Gentry, A. Popejoy Sur. Drlg. 2,800 ft.
Hoffman & Page No. 1 Dodd, 5 mi. S of Ranger, Subd. 11, William VanNorman Sur. Drlg. 850 ft.
States Oil Corp. No. 1 H. S. Schmick, 1 mi. NE Eastland, SE¼ sec. 1, H.&T.C. Sur., Blk. 4. Drlg. 1,300 ft.

Jones County

Fain & McGaha Oil Corp. No. 1 Lewis, 5½ mi. NE Hawley, sec. 37, T.&P. Sur., Blk 15. Fsg. tools 1,565 ft.; skidding 20 ft. E; lost hole.
Fain & McGaha Oil Corp. No. 1 Swenson, ½ mi. W Lueders, 220 ft. from N and W of sec. 2, A. D. Norcop Sur. T.D. 1,557 ft.; U.R. 8¼-in. csg.
Fain & McGaha Oil Corp. No. 1 J. H. Wheeler, 3 mi. NW Sandy Ridge pool, 3,448 ft. from N line and 2,365 ft. from E line, sec. 55, O.A.L. Sur. Moving in.
R. B. Farris et al No. 1 Beasley heirs, 3 mi. S Nugent, 3,216 ft. from N line and 2,552 ft. from E line, W. T. Evans Sur. Spudding.
S. C. Herring No. 1 Eleanor Haynes, sec. 191, S. Andrews Sur., NE edge Sayles pool. Drlg. 1,700 ft.
Hugh King, Jr. et al No. 1 Harris, SE edge Nugent, H. Stover Sur. No. 7. Fsg. 1,968 ft.
Lewis Prod. Co. et al No. 2 Sayles, 240 ft. sec. 6, T.&P. Sur., Blk. 20, 1 mi. S Sayles pool. Spudding.
Lueders Dev. Co. No. 1 Underwood, 2 mi. S. Lueders, sec. 16, N. Scott, but in S. L. Underwood Sur. No. 1. Drlg. 1,550 ft.
Peckham et al No. 1 Denton Co. Natl. Bank, NE cor. county, sec. 17, H.&T.C. Sur., Blk. 3. Spudded.
Petroleum Producers Co. No. 1 H. C. Harvey, 3 mi. E Nugent, 450 ft. from E line and 150 ft. from S line, NW¼ of E½, sec. 9, T.&P. Sur., Blk. 14. Drlg. 600 ft.

Palo Pinto County

D. H. & C. Drlg. Corp. No. 1 Davenport, 6 mi. SE Palo Pinto, L. F. Margaret Sur. A-309. T.D. 2,000 ft.
Paul Garrett No. 1 Mabry heirs, NE cor. county, sec. 2,572, T.E.&L. Sur. S.D. 649 ft.
W. K. Gordon et al No. 2 Canty, 8 mi. W Palo Pinto, sec. 42, T.&P. Sur., Blk. 2. Drlg. 2,260 ft.
Henry Hobbs et al No. 1 Bessie Holt, 4 mi. S Graford, 330 ft. from N and W lines of W½, sec. 1,783, T.E.&L. Sur. Moving in derrick for 4,000-ft. test.
Earnest Lloyd et al No. 1 Bailey, 3 mi. NE Graford, sec. 2,003, T.E.&L. Sur. Loc.

Shackelford County

Humble O. & R. Co. No. 1 Bowman, sec. 80, T.&P. Sur., Blk. 12, 7 mi. E SW cor. county. Drlg. 960 ft.
Iron Mountain Oil Co. No. 1 Ivy, NW cor. county, sec. 159, B.B.B.&C. Sur. Sdy. L. 1,925-30 ft.; S.S.O.; T.D. 1,950 ft.; P.B. 1,933 ft.; treating with 3,000 gals. acid.
Jones, Stastney, Groover & Rose No. 1 Davis, 4 mi. S Morris-Buie pool, sec. 10, T.&P. Sur., Blk. 13. Loc.
Roeser & Pendleton No. 1 Davis, sec. 1, T.&P. Sur., Blk. 13, 10 mi. W Albany. Drlg. 1,345 ft.
Ungren & Frazier No. 1 McCowan, NW cor. county, sec. 158, B.B.B.&C. Sur. L. 1,925-32 ft.; preparing to treat.

(Continued on Page 236)

PERSONAL

JAMES A. MOFFETT, vice president of the Standard Oil Company of California, and chairman of the California-Texas Oil Company, Ltd., is on an extended trip to Australia and other far eastern countries. He will not return to his New York headquarters until July. He will visit New Zealand, Dutch East Indies, China and Japan. The California-Texas company markets oil and its products in the Far East.

M. M. KINLEY, oil well shooter, Tulsa and Houston, Tex., passed through Tulsa last week en route to Houston from a trip to Wyoming.

B. A. MOELLER of General Petroleum Corporation has been made a member of a joint committee just organized in Los Angeles County, California, to, among other things, devise methods of controlling the smoke from citrus growers' smudge pots. The committee members represent the Los Angeles County Board of Supervisors, Los Angeles Chamber of Commerce, California Fruit Growers Exchange and the California Oil and Gas Association. The committee will endeavor to induce the fruit growers to modernize their heaters.

J. E. BLIXT, Montana state petroleum engineer, of Cut Bank, made a trip to Taber, Alberta, to inspect oil developments there.

WALTER WITTLINGER, general manager of the Plains Petroleum Corporation, left Taber, Alberta, recently on a business trip to the eastern states.

J. D. WHEELER, district engineer for West Texas, has been transferred from Iraan, Tex., to the Tulsa office of the Ohio Oil Company, where he is in charge of petroleum engineering under FRANK R. CLARK, chief geologist.

ALFRED. M. LANDON, former governor of Kansas and Republican candidate for president of United States in 1936, could have been seen last Saturday with his field clothes smeared with oil but smiling broadly as he supervised the completion of a 100-bbl. well in Butler County, Kansas. Mr. Landon has about 1,400 acres of leases in the neighborhood.

WILLIAM LOWERY is in hospital at Calgary, Alberta, suffering from injuries received while drilling in Turner Valley recently.

O. L. ROSS, oil operator, of Regina, Saskatchewan, made an airplane trip to Taber, Alberta, recently to inspect the Plains Petroleum well.

A. A. MOODY, vice president and general manager of Jarecki Manufacturing Company, St. Louis, Mo., was a business visitor in Tulsa last week.

HOMER (BUCK) WEAVER, head driller on the Plains Petroleum Corporation well at Taber, Alberta, left recently for his home in Canton, Ohio, for a holiday.

F. C. HOLLAND, general manager, Kewanee Oil & Gas Company, and wife have returned to their home in Titusville, Pa., after spending several weeks in Tulsa.

RALPH W. WALSH, of Los Angeles, Calif., has been appointed general sales manager of the new Richfield Oil Corporation. Mr. Walsh has been in the oil business for 20 years and became associated with the old Richfield company in 1930.

J. O. BUCHTA, treasurer of the Bartlesville Supply Company, St. Louis, Mo., manufacturer of casing shoes, casing clamps and oil well specialties, stopped off in Tulsa on a trip through Oklahoma, Kansas and Texas, calling on distributors.

FRED A. MILLER, of Bradford, Pa., chairman of the board of S. R. Dresser Manufacturing Co., will be in Hollywood, Fla., during March and April, thus escaping the tough early spring weather that usually prevails in northwestern Pennsylvania.

FRED (PETE) WALLACE, Link-Belt Company's oil field division manager, is spending several weeks in California fields and will return to his Houston, Tex., office by way of the Rocky Mountain fields and the Mid-Continent about the middle of April.

Do You Remember?

From The Oil and Gas Journal Files

25 YEARS AGO

The worst winter most oil fields have ever experienced is just breaking up. On March 23, 25 inches of snow fell in Kansas City and the Kansas and Oklahoma fields got their share of the big snowfall.

Waters-Pierce Oil Company stock is quoted at $1,200 bid and $1,700 asked. Standard Oil Company of Indiana stock is quoted at $6,100 bid and $6,500 asked. A stock dividend of 2,900 per cent is soon due by Standard of Indiana.

20 YEARS AGO

A California court is asked to decide the question of when is casing real estate. One party in the case contends that if the casing is solidly fixed in the well, and not dangling from the top of the hole, it is a part of the real estate and can be sold as such.

Paragon Refining Company, of Toledo, Ohio, pays $2,000,000 for J. W. Gilliland's holdings in the Augusta, Kansas, field.

Sales of Cities Company stock from March 1 to March 20 were made at prices varying from $280 to $295 per share. The company's subsidiary, Empire Gas & Fuel Company, is the largest producer in Butler County, Kansas.

10 YEARS AGO

Empire Gas & Fuel Company announces it will lay a 20-inch gas trunk line from the Amarillo field in Texas to Kansas City at a cost of $20,000,000.

Charles K. Clark, president of the Standard Oil Company of Louisiana, dies suddenly in Baton Rouge, La.

The Seminole field passes the 300,000-barrel mark in daily production.

A well in section 4-17-34, Lea County, New Mexico, is standing with 2,500 feet of oil in the hole at 4,735 feet.

D. L. HARPER, director of the Standard Oil Company of New Jersey, accompanied by MRS. HARPER, sailed from New York, March 18, aboard the Normandie.

D. AUSTIN LANE, secretary of the Oil and Gas Association of Alberta, addressed the young men's section of the Calgary board of trade recently on Alberta oil development.

R. C. WINTON, who, until recently, was on the refinery staff of Herbert Green & Company, is taking up an appointment with Trinidad Leaseholds, Ltd., and left London for Trinidad recently.

S. F. SHAW, consulting engineer to the Westgate Oil Company, has returned to Oklahoma City, Okla., from Corpus Christi, Tex., where he was investigating production problems in that area.

A. N. GRIFFITH, field engineer for Cameron Iron Works, Inc., resigned effective March 22 to accept a position with the production engineering department of the Shell Petroleum Corporation.

R. J. FORSYTH, formerly geologist in Shreveport, La., district office of Tide Water Associated Oil Company, becomes affiliated with Seaboard Oil Company as geologist April 1 in that company's headquarters in Dallas, Tex.

JAMES S. POSGATE of Texon, Tex., assistant general manager of the Big Lake Oil Company, largest producer in the Big Lake field in Reagan County, will retire May 1. MR. and MRS. POSGATE and daughter JANE will move to Santa Barbara, Calif.

DR. K. C. HEALD, chief geologist for Gulf Oil Corporation, Pittsburgh, Pa., has returned to the United States and is recuperating at Miami Beach, Fla., from injuries received in an automobile accident January 31 in Trinidad. Doctor Heald spent several weeks in Trinidad hospitals before recovering to an extent permitting transfer to this country. He is at the Barday-Plaza Hotel.

PARAGRAPHS

GEORGE L. RATCLIFFE, president of Baroid Sales Company, is spending a few days in the Tulsa office of the company.

MR. and MRS. JACK H. KELSEY of Big Springs, Tex., are the parents of a son whom they have named DAVID HAMILTON KELSEY. DANA H. KELSEY, vice president of the Sinclair Prairie Oil Company, is one of the proud grandfathers.

DANA H. KELSEY, vice president of the Sinclair Prairie Oil Company, Tulsa, has returned from an inspection trip in the Texas Panhandle. The company is enlarging its district headquarters and force in Amarillo, Tex. LARRY OLES, former land man and geologist, has been advanced to district superintendent in charge of land geology and scouting. CHARLES WATSON has been moved there from Winfield, Kans., for scouting work. DON BENSON has been promoted from scout to district geologist.

RALPH M. MOON, head of the Moon Marketing Company, who has been confined to his home in Tulsa for weeks by serious illness, is reported improving.

FRED MANNING, president of Manning & Martin, Inc., drilling contractors, of Denver, Colo., and Tulsa, has returned to Denver headquarters from a business trip to Kansas.

H. R. MILNER of Edmonton, Alberta, president of the Canadian Western Natural Gas, Light, Heat & Power Company, made a business trip recently to Lethbridge and other southern Alberta points.

JOHN G. BARTRAM, of the Standard Oil & Gas Company at Casper, Wyo., and E. J. BOOS, of the Phillips Petroleum Company, of Denver, Colo., are attending the geologists convention at Los Angeles, Calif.

R. G. MURRAY, construction engineer for United Gas System, Houston, Tex., who recently completed enlargement of Myrtis gasoline plant, was in the Shreveport, La., offices of the United company last week.

MR. and MRS. W. W. LECHNER and MR. and MRS. RAY E. HUBBARD, of Dallas, Tex., will sail from New York on March 26 on the S.S. Santa Lucia for an extended South American tour, returning to Dallas about June 15. Mr. Lechner and Mr. Hubbard are operators in the East Texas field.

T. S. TAYLOR, foreman of the Ohio Oil Company, Haynesville, La., has been honored for outstanding accomplishments in the field of industrial safety by the Joseph A. Holmes Industrial Safety Association. Mr. Taylor is among six individuals presented with certificates of honor for long-time service in promoting health and safety in development, for long-time employment in mining without an accident to themselves, or for skill in supervising the work of others in development operations, for long periods. The Standard Oil Company of Louisiana was awarded a certificate of honor for outstanding safety achievement by the same association.

A. E. JOHNSON, president of the Argo Oil Corporation, of Denver, Colo., is in Chicago for a conference with officials of the Standard Oil Company (Indiana).

JOHN C. BURNE has returned to New York as assistant manager of the New York division of the Colonial Beacon Oil Company. Mr. Burne, whose office will be at 30 Rockefeller Plaza, began his business career in New York with the Standard Oil Company of New Jersey in 1920. He served that company in a number of capacities in its Baltimore, Md., division and for some time was sales manager of the West Virginia division of Standard of New Jersey.

SALLY ANN HUMPHREYS' portrait is not available, so the next best thing seems to be to show her abject servitor, to-wit, her dad, RAY HUMPHREYS. Sally Ann, 10 pounds 13 ounces of cooing coquetry, arrived recently in Mission Hospital, Huntington Park, Calif. "Everything fine," was the report on MRS. HUMPHREYS and Sally Ann. Mr. Humphreys is assistant to the president of Axelson Manufacturing Company.

Heads Humble Refining

Unusually wide experience fits Stuart A. Giraud for the position of general manager of refining and manager of sales for Humble Oil and Refining Company. Mr. Giraud, born in Houston, Tex., in 1887, graduated from St. Thomas College in 1903. He then joined Waters-Pierce Oil Company, handling sales sheets and iron-barrel records. The next year found him chief accountant for Rio Bravo Oil Company. After advancing further in the intricacies of oil company administration with the Gulf interests in Beaumont, he entered into the partnership of Richardson & Giraud, engaging in public accounting and oil brokerage. Here he acquired thorough knowledge of lease dealing and crude marketing. Later he dealt with problems of various oil companies through his own organization, Stuart A. Giraud & Company, certified public accountants. His clients included Paraffin Oil Company, Blaffer & Farish, and Humble Oil Company, all consolidated later as Humble Oil and Refining Company. At this juncture Mr. Giraud was office manager, auditor and general assistant to the president of Humble Oil Company, so he was one of the founders of the new organization.

STUART A. GIRAUD

Except for time in the field artillery during the World War, Mr. Giraud has been with the Humble continuously. Besides being manager of refining he is chairman of the company's manufacturing and marketing committees.

C. E. SHOENFELT, petroleum engineer, of Petroleum Information, Inc., of Denver, Colo., is on a business trip to southern Montana.

O. G. MARTIN, of Denver, Colo., secretary and treasurer of the Argo Oil Corporation, is in Wilmington, Del., on company business.

J. A. WARREN, vice president and secretary of the Kinney-Coastal Oil Company, of Denver, Colo., is in the Big Horn Basin, Wyoming, on company business.

B. P. NEWTON, director of European operations of the Gulf Oil interests, has been visiting London and has gone to the Continent prior to returning to the United States.

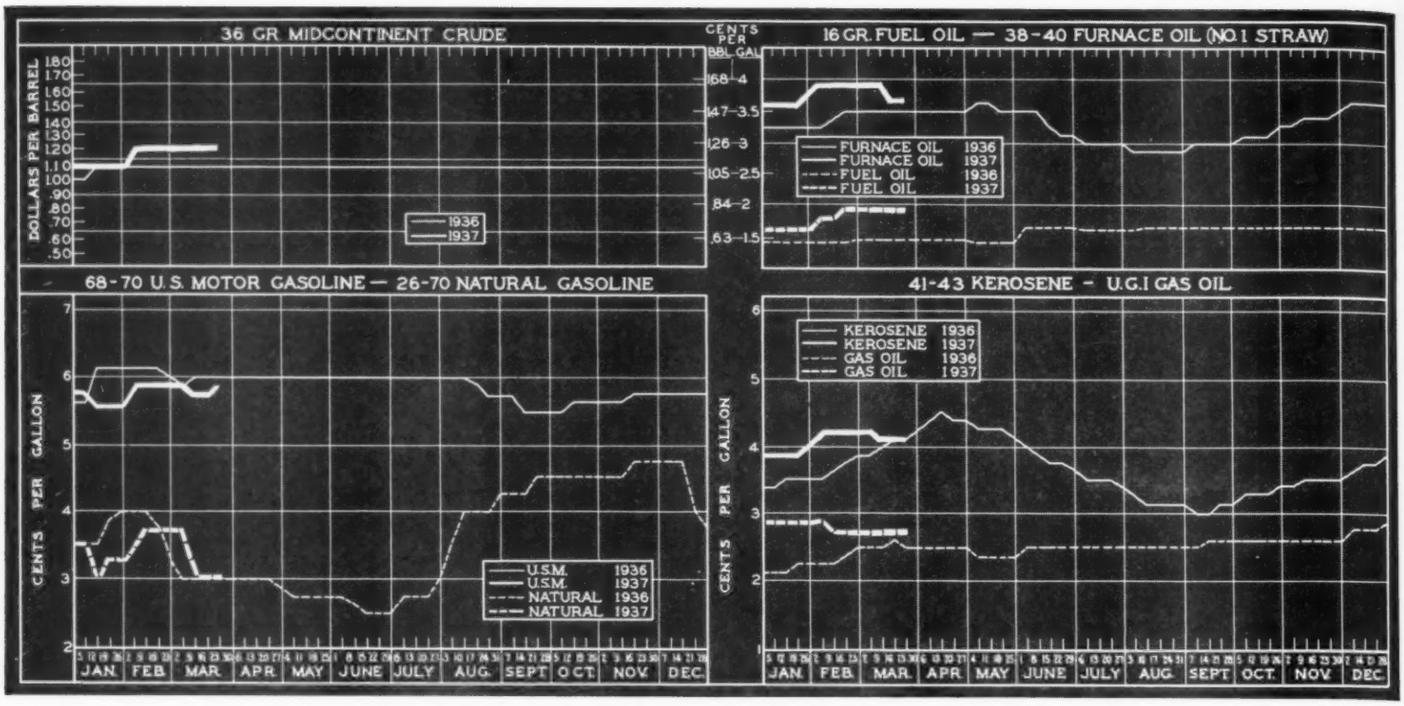
WILLIAM A. MYERS and EVERETT S. SHAW, of Denver, Colo., are in Moffat County to spot the new test of the Anderson-Kerr Drilling Company on South Vermilion Creek.

H. R. CARPENTER, district manager at Bartlesville, Okla., and R. B. MOODY, district manager, Dallas, Tex., for Jarecki Manufacturing Company, were business visitors in Tulsa last week.

LOREN J. BERRY, of St. Joseph, Mich., treasurer of the Theisen-Clemens Company, Michigan distributors of the products of the Mid-Continent Petroleum Corporation, has returned to his home after a visit in Tulsa.

R. D. ROBEY, drilling contractor and engineer, will address the Petroleum Accountants Society of Oklahoma Friday evening, March 26. His topic will cover the practical side of drilling from the making of the location to the actual bringing in of the well. The meeting will be held in the Mayo Hotel.

JOSEPH E. HOLM, manager of the Oklahoma-Kansas division of the Atlantic Refining Company, who recently rounded out 25 years service with the company, was presented with a handsome plaque commemorative of the event by the entire Tulsa office force of the company Monday afternoon.



Representative Mid-Continent Quotations on Crude Oil and Refined Products. Basis Oklahoma (Group 3)

Gasoline Market in Group 3 Livened by Arrival of Motoring Weather

By T. F. SMILEY

Evidence was plentiful in the Group 3 gasoline market this week that spring's arrival was not just something that had happened in the almanac. A moderate but plainly discernible upturn in demand was reported, with tankcar prices stiffening and a general feeling that the 1937 season of heavy consumption was entering its initial stage. Mild weather in widening areas was stimulating retail trade.

Continued huge additions to the country's stock of motor fuel lose much of their power to scare in the light of conditions prevailing in the Mid-Continent territory. A crumbling market often begins at the small refinery which has limited storage facilities and finds itself compelled to dump burdensome stocks for what they will bring. Available information indicated not one of these small operations was having trouble in finding outlets this week.

STOCKS IN STRONG HANDS

The big stocks of gasoline evidently are in the hands of major companies. Second-line refiners were marking up their prices in many cases, showing no eagerness to take on new business, and were buying from small refiners when they found one with anything to sell. There is reason to believe that some of the big companies, unterrified by the growing stocks of motor fuel, have been quietly adding to their storage during the recent period of low prices. In some cases, however, the buying by large companies has been prompted by actual need.

Some refiners were instructing their salesmen to accept no business below 4⅞ cents for third-grade gasoline, 5⅜ cents for middle-bracket, and 6 cents for regular. Feeling was general that the higher quotations put into effect this week would hold. North Texas and Rodessa were reported to be well sold up, with business being turned away in both areas.

Refined Oil Market Barometer

Pleasant motoring weather is quickening the demand for gasoline. Concern over the country's immense stocks is fading as it becomes evident that they are in strong hands. Few if any burdensome inventories appear among the small and second-line refineries. Tractor fuels are entering their season of brisk consumption. Heating oils are drifting downward.

MID-CONTINENT. Gasoline up. Bright stocks firm. Naturals sluggish. Tractor fuels improving.

EAST COAST. Cylinder stocks extremely strong. Gasoline improving. Fuel oils unsteady.

GULF COAST. Gasoline strong. Kerosene weak and prices dropping. Burning oils off.

CALIFORNIA. Gasoline in demand. Gas oil and diesel easy. General market irregular.

PENNSYLVANIA. Third-grade gasoline off. Kerosene and naphthas easy.

CHICAGO. Gasoline in better tone. Demand for lubricants heavy. Kerosene slow.

The situation in East Texas was increasingly gratifying. Eight refineries were operating on crude eligible for federal tenders and four on state-tender crude. Several plants were shut down for repairs. It was believed unlikely that more than a dozen plants would be found operating on federal-tender crude until the prices of refined products are distinctly higher than they have been in recent months. Some East Texas refiners who have switched from federal-tender to state-tender crude evidently have done so because cheap oil which they have been holding in earthen pits has been released by the state tender board for use within the state. Some of this pit-stored crude probably cost no more than 10 cents a barrel. Because of the doubtful legality of its production the federal tender board will not grant its blessing. If the owners have legal crude on their hands they can store or sell it profitably.

There still remains in East Texas tanks oil of dubious origin produced during the reign of law defiance in that district. Gasoline made from it cannot be shipped outside the state, but opinion prevails that state tenders will be issued and the product sold in Texas. If that is done the last barrel of "hot oil" will disappear from East Texas.

Natural gasoline was in slightly better position, though nobody was bragging about its strength. The price of 26-70 was shaded an eighth late last week and that stimulated some jobber buying, which helped. Cargo contract business was a factor in keeping the market fairly steady. Buyers are taking both 26-70 and 18-pound. A little 12-pound material was moved.

TRACTOR FUELS FIRM

Tractor fuels and kerosene, along with prime-white and No. 1 straw distillates, were retaining their steady tone. Spring plowing has begun in some regions, and a good market is expected for several weeks. The heating oils continued their drift to lower levels, only those in the top brackets and sharing with kerosene in the tractor fuel demand, being able to resist the pressure.

The heavy fuels were still in strong demand, though there was not quite such a scramble for them as was seen a few weeks ago. Prices were unchanged. Bright stocks had lost none of their vigor, and there was talk to the effect that another price advance was likely in the near future. Steam-refined stocks were firm. Wax was moving readily, with prices steady.

Gasoline Market on the East Coast Is Reported to Be Definitely Improved

By H. STANLEY NORMAN

NEW YORK, Mar. 23.—What was perhaps the season's last gesture at normal winter weather conditions along the north Atlantic seaboard last week revived a lagging burning oil market. Orders of buyers were insufficient, however, to materially affect the prices, but they did stem the drift into lower ground which had previously dominated trends.

One of the week's market highlights was confirmation by a large refining company on reports that it had purchased 1,000 cars of gasoline in the middle western territory. The large purchase was made in anticipation of record breaking motor fuel consumption which has existed so far this year and which is expected to be accelerated during the normal motoring months. Bright and dark cylinder stocks moved into higher price ranges buoyed by almost unprecedented export demand, but helped materially by brisk orders against contracts by domestic consumers.

Neutral oils in the Pennsylvania refining district advanced from one-half to a full cent per gallon with stocks extremely low for this season of the year. Demand has failed to recede along normal lines this year in neutral oils and as a result stocks are not much larger than on January 1, the usual date of inclining storage figures.

New buying, developed in the fuel oil market by snow and three days of subfreezing temperatures, was largely on a hand to mouth basis. Purchasers declined to extend their commitments beyond immediate requirements feeling that any excess stocks might hang over the summer season and constitute a heavy burden on inventories. Most of the increased buying was confined to kerosene, No. 1, No. 2 and No. 3 fuel oils to replenish depleted consumer tanks. Demand for heavier oils has been maintained on a steady basis since the year opened and this market has been one of the features so far in 1937. Increased activity on the part of practically all industrial consumers who are operating their plants at higher rates is responsible for the improved heavy fuel demand. Prices for heavy oil, however, have not risen above the levels established several weeks ago and the market, generally speaking, can be considered firm to strong.

KEROSENE UNCHANGED

Kerosene prices ranging from 5⅛ to 5⅜ cents per gallon at tankcar loading terminals and in barges remain unchanged. Several refiners in the north Atlantic district resorted to open market purchases in New York, Philadelphia and Baltimore harbors last week to meet their immediate requirements. Necessity of supplying a temporary rush demand was chiefly responsible for the open market trading by large refiners, but the cost of moving material from Gulf Coast to northern ports was also a consideration.

Although no changes have developed in gasoline prices, jobbers are showing more interest in the market and many are now arranging for their summer requirements. Almost without exception, dealers are preparing for record breaking consumption and this development is exerting its influence on the market. High gasoline stocks and record crude production are being discounted in all quarters. Some observers are inclined to view consumption statistics for the first quarter of 1937 from a pessimistic angle. The pessimism is based on the theory that first quarter consumption increases over 1936 may give a distorted picture for the entire year. In view of the mild winter conditions prevailing in the northeastern part of the country, one of the heavy consuming centers, gasoline demand has shown an increase for the first quarter which may not be fully sustained over the entire year.

Nevertheless, the gasoline market in all phases and considered from a broad angle is definitely improved over conditions prevailing up to the middle of March. There appears to be less inclination to shade prices for the sake of doing business and increased buying has definitely strengthened the undertone of the tankcar and harbor barge market. U. S. Motor gasoline in western Pennsylvania is weak and drifted into lower ground the third week in March, but even in that area the better quality motor fuel is firm to strong. Only a limited amount of middle grade gasoline is available in the New York tankcar market at less than 6¾ cents per gallon and the branded product is generally held for 7 cents per gallon.

The tankcar market in Philadelphia is approximately a quarter cent per gallon below the New York quotations. In overlapping territory, confined largely to northern Pennsylvania and parts of New Jersey, the New York dealers are quoting on equal terms with Philadelphia competitors, leading to some unsettlement in the involved areas. As one of the direct results of this situation, Standard Oil Co. of New Jersey lowered consumer tankcar prices a half cent per gallon in Newark on March 12, or to 7 cents per gallon ex-tax.

Export buying was not confined alone to lubricating oil stocks during the week. Activity in the Gulf Coast district continued unabated in gas oil and gasoline. A cargo of 30 plus translucent gas oil was sold on the Gulf Coast for May loading at 3.875 cents per gallon. The price involved on this cargo was slightly below several previous sales made in February and early March. However, in view of slackening demand from domestic consumers, Gulf refiners expressed satisfaction at the figures involved. Expected future export business in gas oil may offset declining domestic demand at least through the early part of the summer, according to some dealers who base their conclusions on the inquiries now placed or proposed.

Two cargoes of 64-66, 375 endpoint gasoline were sold during the week for export shipment at 6.125 cents per gallon, a quarter cent per gallon above earlier business closed in March. The two cargoes are to be loaded in May. Despite the improvement of a quarter cent in price, refiners on the Gulf were not eager to contract cargoes too far into the summer season at present quotations. The possibility of another crude oil advance is preventing refiners from extending their commitments over long periods.

GASOLINE PRICES UNALTERED

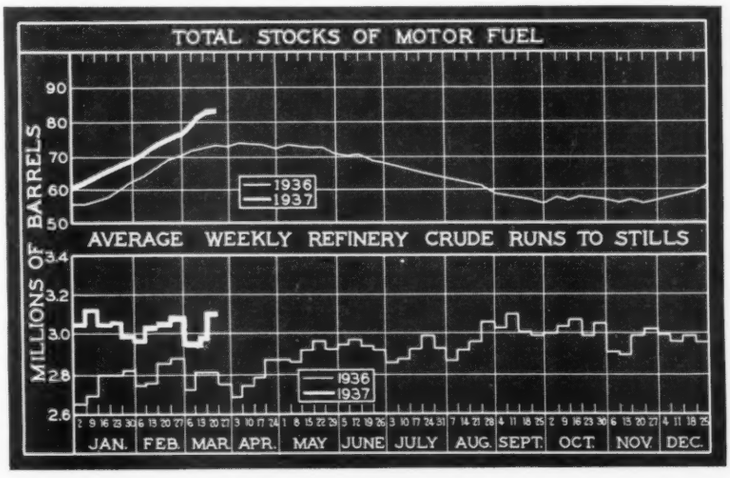
Retail gasoline markets in this district were practically unaltered during the week, although reports were current that depressed areas in New Jersey were gradually shrinking. In metropolitan New York, most service stations continue selling their middle grade motor fuel at six gallons for $1, but a few isolated outlets offered seven gallons for the same flat figure. Ready response of the light fuel oil market to immediate demand during the first half of last week probably reflected a condition which few thought existed. Kerosene moved in barge deliveries at 5⅛ to 5¼ cents during the three or four days of colder weather. Before the snowfall and subfreezing temperatures which carried over last week-end, the kerosene market had been "sloppy." The rapidity with which prices responded to improved demand indicated to observers that stocks were not so plentiful as supposed. Much the same conditions applied to other light heating oils. The wax market appears to be working into higher ground.

A. P. I. Weekly Refinery Statistics

Week Ending March 20, 1937

	Capacity reporting (per cent)	Daily crude runs (bbls.)	Total gasoline (bbls.)	Gas oil and fuel oil (bbls.)
East Coast	100.0	497,000	17,650,000	6,881,000
Appalachian	88.4	113,000	2,861,000	538,000
Indiana, Illinois, Kentucky	92.1	431,000	13,431,000	4,479,000
Oklahoma, Kansas, Missouri	84.6	295,000	9,665,000	2,858,000
Inland Texas	54.3	113,000	2,257,000	1,241,000
Texas Gulf	95.5	706,000	10,470,000	6,349,000
Louisiana Gulf	96.3	132,000	1,822,000	1,612,000
North Louisiana and Arkansas	63.7	42,000	451,000	244,000
Rocky Mountains	69.7	50,000	1,897,000	710,000
California	90.9	492,000	14,952,000	69,247,000
Total reported	88.8	2,871,000	75,456,000	94,159,000
Estimated unreported	.....	224,000	6,167,000	3,128,000
*Estimated total	.....	3,095,000	81,623,000	97,287,000
*Estimated total previous week	.....	2,985,000	81,236,000	98,964,000
*March 21, 1936	.....	2,815,000	73,157,000	95,378,000

*Bureau of Mines basis, currently estimated.



RETAIL OIL MARKETS

Tank-wagon and filling station prices on gasoline and kerosene furnished by the larger marketing firms

Prices as of March 23, 1937

Taxes

The gasoline quotations given in the following tables include the 1-cent federal tax, as well as state, county and city taxes. The gasoline is the regular or standard grade. In most areas a third grade and a premium grade are also available.

Standard Oil Co. (Indiana)

	Gasoline			Kero.
	Tank wag.	Dlr.	Inc. tax	tank-wag.
Chicago, Ill.	16.0	14.0	4.0	10.1
Decatur	16.0	14.5	4.0	10.1
Joliet	16.0	14.5	4.0	10.1
Peoria	16.0	14.5	4.0	10.1
Quincy	15.8	14.3	4.0	9.9
Davenport, Ia.	16.0	14.5	4.0	10.1
Des Moines	15.8	14.3	4.0	9.9
Mason City	16.2	14.7	4.0	10.3
Sioux City	16.0	14.5	4.0	10.1
Duluth, Minn.	15.8	15.3	4.0	10.9
Mankato	16.4	14.9	4.0	10.5
Twin Cities	16.4	14.9	4.0	10.5
La Crosse, Wis.	17.4	15.9	5.0	10.5
Green Bay	17.7	16.2	5.0	10.8
Milwaukee	17.3	15.8	5.0	10.4
Detroit, Mich.	15.1	13.6	4.0	9.8
Grand Rapids	16.5	15.0	4.0	10.9
Saginaw	16.3	14.8	4.0	10.7
Evansville, Ind.	17.5	16.0	5.0	†10.6
Indianapolis	17.7	16.2	5.0	†9.6
South Bend	17.9	16.4	5.0	†9.6
Fargo, N. Dak.	17.4	15.9	4.0	11.5
Minot	18.6	17.1	4.0	12.7
Huron, S. Dak.	17.8	16.3	5.0	10.9
Kans. City, Mo.*	15.4	13.9	4.0	8.9
St. Louis*	15.7	14.2	4.0	9.8
St. Joseph*	15.4	11.9	4.0	9.5
Wichita, Kans.	14.9	13.4	4.0	8.9

*State tax 2 cents, 1-cent city tax and 1-cent federal tax. †Does not include 4-cent state tax.

(Exclusive of state general sales taxes, except Indiana and South Dakota.)

Discounts to commercial consumers: On purchases per month off tank-wagon prices: 1,000 gallons or more, 1.5 cents off; minimum delivery 25 gallons.

Stanolex Fuel Oil in Chicago

Effective Dec. 7, 1936, f.o.b. Chicago tank-wagon prices: Range oil, 1-99 gallons, 8.8 cents; 100-149 gallons, 7.8 cents; 150 gallons and over, 7.3 cents. Stanolex No. 1, 1-99 gallons, 8.8 cents; 100-149 gallons, 7.8 cents; 150 gallons and over, 7.8 cents. Stanolex furnace oil, 1-149 gallons, 7.8 cents; 150 gallons and over, 7.0 cents. Stanolex A, 1-399 gallons, 5.75 cents; 400 gallons and over, 4.75 cents. Stanolex B, 1-799 gallons, 5.75 cents; 800 gallons and over, 4.75 cents.

Atlantic Coast District

STANDARD OIL CO. OF NEW JERSEY

	Gasoline			Kero.
	Tank wag. dlr.	Tank car con'r.	Inc. tax	tank-wag.
Atl'tic City, N.J.	13.0	11.5	4.0	8.0
Newark	12.5	11.0	4.0	8.0
Annapolis, Md.	15.1	13.6	5.0	10.0
Baltimore	14.5	13.0	5.0	8.5
Cumberland	16.9	14.4	5.0	10.0
Wash'g'n, D.C.*	12.5	11.0	3.0	9.0
Danville, Va.	17.7	15.2	6.0	12.9
Norfolk	16.5	14.0	6.0	11.5
Petersburg	16.8	14.3	6.0	11.7
Richmond	16.8	14.3	6.0	11.7
Roanoke	18.0	15.5	6.0	12.9
Charles'n, W. Va.	16.2	13.8	5.0	12.4
Parkersburg	15.6	13.1	5.0	11.2
Wheeling	15.5	14.0	5.0	12.2
Charlotte, N. C.	18.9	16.4	7.0	12.6
Hickory	19.4	16.9	7.0	13.0
Mt. Airy	19.2	16.7	7.0	12.8
Raleigh	18.5	16.0	7.0	12.1
Salisbury	19.0	16.5	7.0	12.7
Charleston, S. C.	17.5	15.0	7.0	11.1
Columbia	18.5	16.0	7.0	12.1
Spartanburg	19.2	16.7	7.0	12.9

*Standard of N. J. has discontinued posting service-station prices at all above points except at Washington where a station price of 16 cents is in effect.

Price basis to commercial consumers, effective Nov. 2, 1936, in New Jersey, Maryland, District of Columbia and small portion of Virginia: On deliveries of 500 gallons or more by hose connection, consumer tankcar price plus .5 cent; less than 500 gallons, plus .75 cent, not taking deliveries by hose connection, plus 1 cent.

Effective Jan. 7, 1937, in greater portion of Virginia and in West Virginia differential above tankcar price on yearly purchases: up to 35,999 gallons, 2.5 cents over tankcar; 36,000 to 119,999 gallons, 2.0 cents; 120,000 to 239,999 gallons, 1.5 cents; 240,000 to 479,999 gallons, 1 cent; over 480,000 gallons .5 cent over tankcar price.

Effective Jan. 25, 1937, in North and South Carolina: Deliveries of 50 gallons or more by tank-wagon billed at price 2 cents over posted consumer tankcar price in effect at time and place of delivery. Deliveries less than 50 gallons billed at price .6 cent over posted tankcar price. Discount for kerosene, 1 cent off tank-wagon price for 25 gallons or more under contract (contract not necessary in Baltimore) except no discount in New Jersey.

Southern District

STANDARD OIL CO. OF KENTUCKY

	Gasoline			Kero
	Tank wag.	Net dlr.	Inc. tax	tank-wag.
Atlanta, Ga.	22.0	19.0	7.0	*13 0
Augusta	18.5	15.5	7.0	*14.0
Macon	21.5	18.5	7.0	*14.5
Savannah	20.0	17.0	7.0	*13.0
Birm'ham, Ala.	21.0	18.0	8.0	12.0
Mobile	22.0	19.0	9.0	11.0
Montgomery	23.0	20.0	9.0	12.5
Jackson, Miss.	21.0	18.0	7.0	*13.0
Vicksburg	20.5	17.5	7.0	*13.0
Jacksonville, Fla.	20 5	17.5	8.0	11.0
Miami	20.5	17.5	8.0	12.5
Pensacola	22 0	19.0	9.0	12.0
Tampa	21.5	18.5	8.0	12.0
Lexington, Ky.	19.5	16.5	6.0	11.0
Covington	19.0	16.0	6.0	11.0
Louisville	19.5	16.5	6.0	10.5
Paducah	19.0	16.0	6.0	10.0

Price basis to tank-wagon consumers: Effective January 4, 1937, 3 cents per gallon below tank-wagon price. Kerosene prices in all states subject to 2 cents discount except in Kentucky where prices are net.

*Includes 1 cent state tax. Montgomery, Ala., has a county tax of 1 cent per gallon, and a city tax of 1 cent per gallon on gasoline, in addition to state tax; and 1 cent per gallon on kerosene. Mobile, Ala., has a city gasoline tax of 2 cents per gallon; Birmingham, Ala., has a city gasoline tax of 1 cent per gallon. Pensacola, and Tampa, Fla., have a city gasoline tax of 1 cent.

Rocky Mountain District

CONTINENTAL OIL CO.

	Gasoline			Kero.
	Dealer	Serv. sta.	Inc. tax	tank-wag.
Denver, Colo.	17.5	....	5.0	11.5
Grand Junction	20.0	....	5.0	15.0
Pueblo	15.5	....	5.0	10.5
Casper, Wyo.	18.0	....	5.0	11.5
Cheyenne	18.0	....	5.0	13.0
Butte, Mont.	19.5	....	6.0	15.5
Billings	21.5	....	6.0	15.5
Helena	21.5	....	6.0	15.5
Great Falls	21.5	....	6.0	15.5
Salt Lake, Utah	19.5	....	5.0	16.0
Twin Falls, Ida.	21.5	....	6.0	18.0
Boise	21.0	....	6.0	18.0
Albu'que, N. M.	17.5	....	6.5	12.0

Ohio

STANDARD OIL CO. OF OHIO

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank-wag.
Ohio points	18.0	(†)	5.0	*13.5

*Includes state tax of 1 cent.

†Following the leasing of service stations to dealers at many points the company no longer posts a statewide service station price.

Pacific Coast Territory

STANDARD OIL CO OF CALIFORNIA

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank-wag.
San Francisco	17.5	18.5	4.0	11.5
Los Angeles	17.0	18.0	4.0	9.0
Fresno, Calif.	18.5	19.5	4.0	12.0
Phoenix, Ariz.	21.0	22.0	6.0	‡16.0
Reno, Nev.	20.0	21.0	5.0	13.0
Portland, Ore.	20.0	21.0	6.0	13.5
Seattle, Wash.	20.0	21.0	6.0	13.5
Tacoma	20.0	21.0	6.0	13.5
Spokane	23.0	24.0	6.0	16.5

‡Includes 5-cent state tax.

Discounts to dealers: On gasoline, off tank-wagon price, to 100 per cent dealers, 3 cents; to split dealers, 2 cents. To commercial consumers: on tank-wagon price: on single deliveries of 40 gallons and over, advance quantity discount extended at time of delivery, 3 cents. Service station schedule applies on single deliveries less than 40 gallons. On kerosene in tankcar, transport truck and trailer delivery, 3 cents off tank-wagon price; plant deliveries to jobbers, 2.5 cents below tank-wagon.

New York and New England

SOCONY-VACUUM OIL CO., INC.

	Gasoline			Kero.
	Tank wag. dlr.	Tank car con'r.	Inc. tax	tank-wag.
Albany, N. Y.	13.5	12.0	4.0	7.75
*Met. N. Y.:				
Manh't'n, Br'nx	13.5	12.0	4.0	7.25
State Island	13.75	12.0	4.0	7.25
Q'ns & Brklyn	13.5	12.0	4.0	7.25
Buffalo	14.3	12.67	4.0	8.25
Rochester	14.3	12.74	4.0	8.25
Syracuse	14.3	12.7	4.0	8.75
Boston, Mass.	13.5	12.0	4.0	7.50
Portland, Me.	15.3	13.0	5.0	7.75
Manch'ter, N. H.	15.8	13.5	5.0	8.00
Burlington, Vt.	15.4	13.4	5.0	8.75

*Does not include 2 per cent city sales tax which is calculated on basis of net retail price exclusive of state and federal taxes.

Price basis to undivided dealer: Posted dealer tank-wagon price less .5 cent. Price basis to commercial consumer: Effective Nov. 15, 1936, monthly purchases of 25,000 gallons and over, consumer tankcar prices at delivery point plus .5 cent per gallon; monthly purchases of 5,000 to 25,000 gallons, undivided dealer price at delivery point: Monthly purchases under 5,000 gallons, pay divided dealer tank-wagon price at delivery point.

Pennsylvania, Delaware and Part of New England

ATLANTIC REFINING CO.

	Gasoline			Kero.
	Tank wag. dlr.	Tank car con'r.	Inc. tax	tank-wag.
Philadelphia, Pa.	14.0	12.5	5.0	10.5
Pittsburgh	15.5	13.5	5.0	11.0
Allentown	14.5	13.25	5.0	11.0
Erie	14.5	13.0	5.0	11.0
Scranton	14.5	13.25	5.0	11.0
Altoona	15.5	13.5	5.0	11.0
Dover, Del.	14.5	....	5.0	11.0
Wilmington	13.5	....	5.0	11.0
Springf'd, Mass.	13.8	....	4.0	7.5
Worcester	14.3	....	4.0	8.0
Hartford, Conn.	13.6	....	4.0	7.5
NewHaven	13.5	....	4.0	8.0
Providence, R.I.	12.5	....	3.0	7.5

Atlantic has transferred all stations to dealers except in Philadelphia and Pittsburgh where prices are 17.5 and 20.0 cents per gallon respectively.

Price basis to undivided dealers—Dealer tank-wagon less .5 cent per gallon.

Consuming accounts not under contract—when made by tank-wagon in quantities of 50 gallons or over, dealer price.

Commercial accounts under contract—annual consumption 2,500 to 100,000 gallons per year, 1 cent above posted tankcar price; over 100,000 gallons per year, .5 cent above posted tankcar price.

Nebraska

STANDARD OIL CO. OF NEBRASKA

	Gasoline			Kero.
	Tank wag.	Dlr.	Inc. tax	tank-wag.
Omaha	17.4	15.9	5.0	10.4
McCook	18.1	14.3	5.0	11.1
Norfolk	17.8	16.3	5.0	10.8
North Platte	18.2	16.7	5.0	11.2
Scotts Bluff	18.9	17.4	5.0	10.9

Discounts to commercial consumers for tank-wagon deliveries covered only by standard commercial consumers contract, effective Jan. 1, 1935.

Central South District

STANDARD OIL CO. OF LOUISIANA

	Gasoline			Kero.
	Tank wag. dlr.	Tank car con'r.	Inc. tax	tank-wag.
N. Orleans, La.	20.0	17.5	*10 0	†11.0
Baton Rouge	18.0	15.5	8.0	12.0
Alexandria	18.5	16.0	8.0	12.0
Lafayette	19.0	16.5	8.0	12.5
Lake Charles	19.0	16.5	8.0	12.5
Shreveport	17.5	15.0	8.0	9.5
Knoxville, Tenn.	21.0	18.5	8.0	14.0
Memphis	19.0	16.5	8.0	12.0
Chattanooga	20.5	18.0	8.0	13.5
Nashville	20.0	17.5	8.0	13.0
Bristol	19.75	18.5	8.0	14.5

*Includes 2-cent parish tax. †Includes 1 cent parish tax and 1 cent state tax.

Standard of La. has transferred all stations to dealers except in New Orleans and Baton Rouge where station prices are 23.6 and 21.5 cents per gallon, respectively.

Price basis to commercial consumers: effective Dec. 21, 1936, deliveries of 50 gallons or more in one delivery, posted consumer tankcar price plus 2 cents per gallon; consumers taking deliveries of less than 50 gallons at one time pay posted consumer tankcar price plus 6 cents per gallon.

Louisiana kerosene prices include 1-cent state tax.

Naphtha

STANDARD OIL CO (INDIANA)

	Tank-wagon*
Oleum spirits	15.7
V.M.&P. naphtha	16.0
Cleaners' naphtha	15.0
Stanisol	15.0

*Prices include 3-cent Illinois tax, but not 1-cent federal tax or 2 per cent retail occupational tax.

Prices f.o.b. Chicago. Each price subject to discount of 1 cent per gallon for 150 gallon lots if covered by contract.

Oklahoma and Arkansas

CONTINENTAL OIL CO.

	Gasoline			Kero.
	Dealer	Serv. sta.	Inc. tax	tank-wag.
Muskogee, Ok.	15.5	....	5.0	7.0
Okla. City	13.0	....	5.0	8.0
Tulsa	14.0	....	5.0	6.0
Ft. Smith, Ark.	15.0	....	5.0	10.0
Little Rock	17.5	....	7.5	9.5
Texarkana	15.0	....	5.0	9.0

Texas

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank-wag.
Dallas, Tex.	14.0	18.0	5.0	8.0
Fort Worth	14.0	18.0	5.0	8.0
Houston	14.5	18.5	5.0	8.0
San Antonio	14.5	18.5	5.0	8.0

Canada*

3 Star Imperial Gasoline
IMPERIAL OIL, LTD.

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank-wag.
Hamilton, Ont.	22.0	....	6.0	17.0
Toronto, Ont.	22.0	24.5	6.0	17.0
Brandon, Man.	29.8	32.8	7.0	23.8
Winnipeg, Man.	28.2	31.2	7.0	20.7
Regina, Sask.	29.5	....	7.0	23.0
Saskatoon, Sask.	32.3	....	7.0	24.8
Edmonton, Alta.	30.5	33 5	7.0	24.3
Calgary, Alta.	28.0	31.0	7.0	21.5
Vancouver, B. C.	22.0	26.0	7.0	23.0
Montreal, Que.	19.0	....	6.0	17.8
St. John, N. B.	24.0	28.0	8.0	18.8
Halifax, N. S.	24.0	28.0	8.0	18.5

*Imperial gallon used in Canada.

Discount to dealers: Divided dealers pay 3 cents per gallon below station price; undivided dealers pay 4 cents per gallon below station price except in cities of Hamilton, Toronto and Montreal when discounts below station prices are one-half cent per gallon less and in Vancouver where discounts are 1 cent per gallon more.

Retail Price Changes

Standard Oil Co. (Indiana) March 16 reduced dealer gasoline 2 cents in St. Joseph.

Standard Oil Co. of New Jersey March 12 reduced tankcar gasoline .5 cent in Newark.

Standard Oil Co. of Louisiana March 10 reduced tank-wagon kerosene 1.5 cents in Shreveport.

Standard Oil Co. of California March 22 advanced tank-wagon and station gasoline .5 cent throughout its trade territory.

Maryland Tax Bonus

Gasoline tax revenues of Maryland were $115,000 larger in January, 1937, than in January, 1936, largely as a result of the postponement until April 1 of the final date for registering motor vehicles. January collections totaled $705,837, the state comptroller's office has reported, as against $590,488 for January, 1936. It is expected that February and March income will also increase, with the total gain estimated as more than a quarter of a million dollars.

Motorists have expressed approval of the deferred registration plan, which they call "free wheeling," and which has relieved them of the necessity of paying registration fees from purses deflated by Christmas-New Years spending.

PRICES OF REFINED PRODUCTS

All quotations f.o.b. plant in cars for interstate or export movement except as otherwise noted

Prices as of March 23, 1937

The following quotations are exclusive of the federal excise taxes of 1 cent a gallon on gasoline and 4 cents on lubricating oils.

Refinery Gasoline

OKLAHOMA (Group 3)—

U. S. Motor grades:		
62 octane and below (3d gr.)	.04⅞	.05
63-67 octane	.05¼	.05½
68-70 octane (regular)	.05⅞	.06⅛
60-62 400 grades:		
62 octane and below (3d gr.)	.04⅞	.05
63-67 octane	.05¼	.05½
68-70 octane (regular)	.05⅞	.06⅛
64-66 375		.05⅛
68-70 360	.05¼	.05⅜

NORTH TEXAS—

U. S. Motor grades:		
62 octane and below	.04⅞	.05
63-67 octane	.05¼	.05½
68-70 octane (regular)	.05⅞	.06⅛
60-62 400	.04¾	.05
64-66 375	.05	.05⅛

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

U. S. Motor grades:		
62 octane and below	.05⅛	.05⅜
62-67 octane		.05⅜
68-70 octane (regular)		.06¼

ARKANSAS (Ark., N. La., Miss. del.)—

U. S. Motor grades:		
62 octane and below	.05	.05⅛
63-67 octane	.06	.06⅛
68-70 octane (regular)	.06¼	.06⅜

CHICAGO (Based on Group 3)—

U. S. Motor grades:		
62 octane and below	.04¾	.05
63-67 octane	.05⅛	.05⅜
68-70 octane (regular)	.05¾	.06
60-62 400 grades:		
62 octane and below	.04¾	.05
63-67 octane	.05⅛	.05⅜
68-70 octane (regular)	.05¾	.06
64-66 375	.05	.05⅛
68-70 360	.05¼	.05⅜

PENNSYLVANIA (inland refineries)—

58-60 U. S. Motor:		
Below 60 octane		.04⅝
60-64.9 octane	.06⅝	.06⅞
65-70 octane	.06⅞	.07
64-66 375		.05
68-70 350		.05⅜

CALIFORNIA (domestic movement)—

54-58 U. S. Motor	.07	.08
58-60 400, 65 octane and higher	.07¾	.08¾

EAST COAST (domestic)—

U. S. Motor below 60 octane:		
*New York (Bayonne)		.06¾
Baltimore		.06¾
U. S. Motor, 60-64.9 octane:		
*New York (Bayonne)		.07
Philadelphia	.07	.07¼
Boston		.07¼
Baltimore	.07	.07¼
Charleston, S. C.		.07¼
U. S. Motor, 65 and above:		
*New York (Bayonne)		.07¼
Philadelphia	.07¼	.07½
Boston		.07½
Baltimore	.07¼	.07½
Charleston, S. C.		.07½

*All grades of gasoline one-eighth to one-fourth cent less for barge shipments. New York harbor prices are for New York and New England delivery. Prices for New Jersey delivery one-fourth cent lower.

GULF COAST (domestic)—

U. S. Motor grades:		
Below 60 octane	.05½	.05⅝
60-64.9	.05¾	.06
65 octane and higher	.06⅛	.06⅝

Naphtha

PENNSYLVANIA (inland refineries)—

50-52 450 (blending)	.04½	.04⅝
52-54 450 (blending)	.04½	.04⅝
54-56 450 (blending)	.04⅝	.04¾

Natural Gasoline

OKLAHOMA (Group 3)—

Grade 26-70		.03
Grade 18-55	.03⅝	.03¾
Low vapor pressure grade:		
*14-pound v.p. (max.)	.04⅛	.04¼
*12-pound v.p. (max.)		.04⅜

*Nominal.

NORTH TEXAS—

Grade 26-70		.03
Grade 18-55	.03⅝	.03¾

CALIFORNIA—

75-85 375-390	.06¾	.07½

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

Grade 26-70		.03⅜

Tractor Fuel

OKLAHOMA (Group 3)—

40-42 gr., 315-325 i.b.p., 110 flash, 540-550 e.p.	.04⅛	.04¼
41-43 gr., 300-350 i.b.p., 110-125 flash, 500-520 e.p.	.04¼	.04⅜
46-48 gr., 210-230 i.b.p., 480 max. e.p.	.04⅝	.04⅞

Kerosene

(All kerosene water white)

OKLAHOMA (Group 3)—

41-43	.04¼	.04⅜
42-44	.04¼	.04½

NORTH TEXAS—

41-43	.04¼	.04⅜

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

41-43	.04⅜	.04½

ARKANSAS (Ark., N. La., Miss. del.)—

41-43	.04⅝	.04⅞

PENNSYLVANIA (inland refineries)—

45		.04⅞
46		.05
47		.05⅛

CHICAGO (Based on Group 3)—

41-43	.04⅛	.04¼
42-44	.04¼	.04½

CALIFORNIA (Pac. Coast market)—

38-43 high burning test	.04	.05

NEW YORK (Bayonne, N. J.)—

41-43		.05½

*GULF COAST (domestic)—

41-43		.05⅝

*Barge price one-eighth cent lower.

Furnace Oil

OKLAHOMA (Group 3)—

No. 1 prime white, 38-42	.03⅞	.04
No. 1 straw, 38-40	.03⅝	.03⅞
No. 2 straw, 32-36	.03¼	.03⅝
No. 2 dark, 32-36	.03¼	.03⅝
No. 3, zero to 15, 28-32	.03⅛	.03¼
No. 3, 15 and above, 28-32	.02⅝	.02⅝

NORTH TEXAS—

No. 1 prime white, 38-42	.03⅞	.04
No. 1 straw, 38-40	.03⅝	.03⅞

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

No. 2, 32-36	.03⅛	.03⅝

ARKANSAS (Ark., N. La., Miss. del.)—

No. 2, 32-36	.03⅝	.03¾

CHICAGO (Based on Group 3)—

No. 1 prime white, 38-40	.03⅞	.04⅛
No. 1 straw, 38-40	.03⅝	.03¾
No. 2 straw, 32-36	.03⅛	.03⅝
No. 2 dark, 32-36	.03¾	.03⅛
No. 3 zero to 15, 28-32	.03¾	.03⅛
No. 3, 15 and above, 28-32	.02⅝	.02¾

NEW YORK (Bayonne, N. J.)—

*No. 1		.05¾
*No. 2		.05
*No. 4		.04¾

*Barge deliveries one-eighth to one-fourth cent under above, tankcar price.

Gas Oil and Fuel Oil

(Gas oil per gal.; fuel oil per bbl.)

OKLAHOMA (Group 3)—

U.G.I. gas oil	.02¾	.02⅞
No. 4, low cold test, 24-28	1.10	1.15
No. 4, 15 and above, 24-28	.90	.95
No. 5, low cold test, 18-22	.87½	.92½
Below 18 fuel oil, industrial	.80	.87½

NORTH TEXAS—

U.G.I. gas oil	.02¾	.02⅞
No. 4, low cold test, 24-28	1.10	1.15
No. 5, low cold test, 18-22	.87½	.92½
Below 18 fuel oil, industrial	.80	.85

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

10-14 fuel oil, industrial	.75	.85

ARKANSAS (Ark., N. La. and Miss. delivery)—

10-14 fuel oil, industrial	.70	.72½

CHICAGO (Based on Group 3)—

U.G.I. gas oil	.02⅝	.02⅞
No. 4, low cold test, 24-28	1.10	1.15
No. 4, 15 and above, 24-28	.90	.95
No. 5, low cold test, 18-22	.87½	.92½
No. 6, low cold test, 10-16	.80	.85

PENNSYLVANIA (inland refineries)—

36-40	.04⅝	.04½

CALIFORNIA—

Los Angeles:		
30-34 gas oil, per bbl.	1.05	1.25
24 plus diesel (bunkers)	1.15	1.35
12-16 (bunkers at tidewater)	.90	1.00
10-16 (cargo lots)	.70	.95
12-17 (tankers)	.75	.95
San Joaquin Valley:		
10-18 (tankcars)	.70	.90
24 plus diesel, per bbl.	1.00	1.35
San Francisco:		
27 plus diesel		1.40
24 plus diesel (bunkers)		1.40
10-16 (bunkers)		1.00

GULF COAST—

28-30 gas oil	.03⅝	.04
28-30 diesel (bunkers)		1.65
Bunkers (bulk cargoes)		.95
Bunker C (bunkers)		1.00

NEW YORK (Bayonne, N. J.)—

27 plus. gas oil		.04¾
28-30 diesel (lighterage 6¼c per bbl.)		1.85
28-30 diesel (tankcars)		.04¾
*Bunker C (to ocean-going ships in N. Y. harbor)		1.15
Industrial fuel (tankcars)		.04½

*Lighterage charge 5c bbl. additional.

Bright and Steam-Refined

OKLAHOMA (Group 3)—

Bright Stocks:		
190-200 D, 15-25		.23
150-160 D, 0-10		.20
150-160 D, 15-25		.19½
150-160 E, 15-25		.19
100-110 D, 0-10		.18
Steam refined:		
631 green (treated)		.16½
600 dark green (untreated)		.05

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 145-50 at 210, 540-550 flash):

10 pour test	.28	.28½
15 pour test	.27	.27½
20 pour test	.26	.26½
25 pour test	.25	.25½
Steam refined:		
600		.17
650		.18½
600 Pennsylvania flash		.19½
630 flash		.23½
600 Warren E filtered		.19½

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

Zero to 10 Cold Test:		
150-3		.09
180-3		.10
180-4		.09½
200-3		.10½
200-4		.10
250-3		.11½
250-4		.11
280-3		.12½
280-4		.12
300-3½		.13
400-3½		.14
100-2½ paraffin oil		.05¾
15-20 Cold Test:		
200-3		.10
200-4		.09½
250-3		.11
250-4		.10½
280-3		.12
280-4		.11½

GULF COAST—

Pale Oils:		
200-3	.07	.07¼
300-3	.07½	.07⅝
500-3½	.08⅛	.08⅜
750-3½	.08⅝	.09¼
1,200-3½	.09½	.09¾
1,500-4	.09¾	.10
Red Oils:		
200-5-6		.07
300-5-6	.07¼	.07½
500-5-6	.08	.08⅛
750	.08¾	.09
1,200-5-6	.09¼	.09½

CALIFORNIA (moving to dom. market)

Pale Oils:		
100-2½-3	.07	.08
200-2½-3	.07	.08
300-2½-3	.07	.08
400-3-4	.09	.11
450-3-4	.09	.11
550-3-4	.09	.11
600-3-4	.09	.11
Red Oils:		
200-4-5	.07	.08
300-5-6	.07	.08
350-5-6	.10½	.11½
400-5-6	.10½	.11½
450-5-6	.10½	.11½
500-5-6	.10½	.11½
600-5-6½	.10½	.11½
700-6½ plus	.10½	.11½
750-6½ plus	.10½	.11½
900-6½ plus	.10½	.11½

PENNSYLVANIA—

150 vis. at 750° F. color, 400-405 flash:		
Zero pour test	.23½	.24
10 pour test	.22½	.23
15 pour test	.22	.22½
25 pour test	.21	.21½
180 vis. at 70° F., 3 color:		
25 pour test	.23½	.24
200 vis. at 70° F., 3 color:		
Zero pour test	.27	.27½
10 pour test	.26	.26½
15 pour test	.25½	.26
25 pour test	.24½	.25

Wax and Petrolatum

(Prices per pound)

OKLAHOMA (Group 3)—

124-126 (a.m.p.) w.c. scale		.02¾

PENNSYLVANIA (inland refineries)—

122-124 (a.m.p.) w.c. scale	.0265	.0270
124-126 (a.m.p.) w.c. scale	.0270	.0275

NEW YORK—

Wax in bags fully refined:		
122-125 (a.m.p.) wax		.0445
125-127 (a.m.p.) wax		.0455
128-130 (a.m.p.) wax		.0480
130-132 (a.m.p.) wax		.0505
133-135 (a.m.p.) wax		.0535
135-137 (a.m.p.) wax		.0560
124-126 (a.m.p.) w.s.	.0250	.0255
124-126 (a.m.p.) y.s.	.0260	.0265
Petrolatum in barrels, carload lots:		
Dark green		.01⅞
Amber	.02⅞	.03
Extra amber	.03	.03⅛
Lily white	.06⅝	.06¾
Snow white	.07¾	.07⅞
Cream	.05⅝	.05¾

Export Prices

GASOLINE

GULF COAST—

U. S. Motor		.05½
60-62 400		.05⅝
61-63 390	.05⅝	.05⅞
64-66 375	.05⅞	.06

LOS ANGELES—

U. S. Motor grades:		
53-55 octane		.04¾
55-65 octane	.04¾	.05
65-67 octane		.05
67-69 octane		.05¼
Above 69 octane	.05½	.06

KEROSENE

GULF COAST—

41-43 prime white	.05	.05¼
41-43 water white	.05½	.05⅝
44 water white	.05⅝	.05¾

LOS ANGELES—

41-43 water white	.04½	.05

LUBRICANTS

(Pennsylvania Grade)

NEW YORK (f.a.s. in bbls.)—

Cylinder Stocks:	
600 Warren E	.26½
600 S.R. unfiltered	.23½
630 S.R. unfiltered	.25
600 flash, S.R.	.26
630 flash, S.R.	.28
Bright Stocks:	
8 color	.31
6½ plus color in dilution	.30½

NEUTRAL OIL

200-3 color	.29½
150-3 color	.26½

PARAFFIN WAX

NEW YORK (prices per pound)—

123-125 a.m.p.		.04125
125-127 a.m.p.		.0425
128-130 a.m.p.		.0450
133-135 a.m.p.		.0525
135-137 a.m.p.		.0550
Crude scale:		
124-126 w.s.	.0260	.0270
124-126 y.s.	.0245	.0250

CRUDE OIL PRICES

Oklahoma, Kansas, North Central and East Central Texas

(January 28, 1937)

East Texas*	$1.27
Van, Tex.†	1.10
Camp Hill, Tex.	1.27
Cass County, Tex.‡	1.25
Talco	.73
Altus and Tipton, Okla.§	1.20
Other fields (see gravity table).	

*All companies. †Humble Oil & Refining Co.; Pure Oil Co. ‡Texas Co. §Gulf Oil Co. Talco by Humble Oil & Refining Co.

West Texas

See gravity table.

Pecos County*	.91
Pecos shallow†	.81

*Shell Petroleum Co., Gulf Pipe Line Co., and Humble Oil & Refining Co. †Shell Petroleum Corp.

Gulf Coast

(January 28, 1937)

Choctaw and Darrow, La.	See note below
Clay Creek, Tex.	$1.00
Garden Island, La.	1.37
Cleveland, Tex.	1.27
Hardin, Tex.	1.15
Tomball, Tex.	1.30
Lafitte, La.	1.24
Livingston, Tex.	1.27
Satsuma	1.20
Heyser, light (Nov. 1, 1936)	1.15
Heyser, heavy (Nov. 1, 1936)	.90
Placedo (Nov. 1, 1936)	.90
Welsh, La.	.98
Tepetate (La.) (Jan. 4, 1937)	1.12

Greta, Refugio, O'Connor, McFadden, Saxet, Segno, Taft, Tom O'Connor and Plymouth take same gravity prices as Gulf Coast. Duval, Jim Hogg, Webb and Zapata counties, Texas, and Heyser and Placedo fields take Mirando gravity prices. Jennings, La., 5 cents lower than Gulf Coast prices on each degree. Segno, Texas, takes Gulf Refining Co.'s Gulf Coast prices. Choctaw and Darrow, Louisiana, posted for first time by Standard Oil Co. of Louisiana, start below 21 degrees at 90 cents, with 3-cent differential up to 25 gravity, then 2-cent differential up to 40 and above, $1.36.

Rocky Mountain States

(Effective January 28, 1937)

Iles, Colo., light*	$1.18
Iles, Colo., heavy*	1.12
Greybull, Wyo.*	1.30
Torchlight, Wyo.*	1.30
Grass Creek, Wyo., light*†	1.30
Grass Creek, Wyo., heavy (Nov. 4, 1936)*†	.62
Hamilton Dome, Wyo. (Nov. 4, 1936)*	.57
Elk Basin, Wyo., light*†	1.30
Frannie, Wyo., heavy*	.62
Frannie, Wyo., light	.82
Hogback, N. Mex.*	1.33
Pondera, Mont. (Jan. 26, 1936)*	1.05
Salt Creek, Dutton Creek and Midway, Wyo., take Stanolind's Oklahoma prices on a gravity basis.	
Big Muddy, Wyo.†	1.23
Rock Creek, Wyo.†	1.20½
Lea County, N. M. (see West Texas gravity table).	
Artesia, N. Mex.	.90
Maljamar, N. Mex.	.90
Canon City and Florence, Colo.	1.10
Florence, Colo.	.98
Lance Creek, Wyo.	.97
Sunburst, Mont. (June 5, 1936)	1.20
Cat Creek, Mont.	1.40
Cut Bank, Mont.	1.35

*Stanolind Oil & Gas Co. †Ohio Oil Co. ‡Continental Oil Co. Cut Bank by Toronto Pipe Line Co.

Middle Western States

OHIO OIL CO.
(Effective January 28, 1937)

Lima	1.25
Illinois	1.35
Princeton, Ind.	1.35
Midland, Mich.	1.42
West Branch, Mich.	1.26
Buckeye (March 16, 1937)	1.39½
Arenac, Mich.	1.26
Muskegon, Mich.	1.00
Eastern Kentucky:	
Big Sandy River	1.42
Kentucky River	1.50
Western Kentucky	1.40

Midland, Mich., price posted by Simrall Corp. and Pure Oil Co. includes Greendale, Porter, Beaverton, Crystal and equal grades. West Branch and Arenac by Simrall Corp., effective Jan. 29. Eastern Kentucky crude purchased by Ashland Refining Co., Ashland, Ky. Buckeye posted by Simrall Corp. and Pure Oil Co.

Southwest Texas

(January 28, 1937)

Pettus	1.37
Salt Flat, Darst Creek, Hilbig, Carroll, Clark, Zoboroski	1.09
Luling	1.00
Lytton Springs	1.12

Saxet and Taft take same gravity table as Gulf Coast.

North Louisiana and Arkansas

Smackover, all grades	$ .90
Tullos and Urania	1.32
El Dorado East field	.90
Union County, Ark.	.90
Ouachita County, Ark.	.90

Eastern States

TIDE WATER PIPE LINE CO.
(Effective Feb. 24, 1937)

Bradford, Pa.	$2.67
Allegany, N. Y.	2.67

SOUTH PENN OIL CO.
(Effective Feb. 24, 1937)

Pennsylvania Grade Oil in National Transit Lines (Bradford field)	2.67
Pennsylvania Grade Oil in Southwest Pennsylvania Lines	2.42
Pennsylvania Grade Oil in Eureka Pipe Line lines	2.37
Pennsylvania Grade Oil in Buckeye Pipe Line lines	2.22
Corning Grade Oil in Buckeye Pipe Line Co.'s lines (Sept. 18, 1936)	1.32

PENNZOIL CO.
(Effective Feb. 24, 1937)

Pennsylvania Grade Oil in National Transit Lines:	
Group A	2.67
Includes Cochran, Franklin, Hamilton and Doolittle districts.	
Group B	2.66
Includes Tidioute district.	
Group C	2.65
Includes Turkey and Tidioute districts.	
Group D	2.64
Includes Bear Creek and Porkey districts.	
Group E	2.61
Includes Eldeneau, Bull Creek, Rough Run, Carbon, Dipner, Bredlin, McJunkin, Jameson, Kenerdell, Emlenton, Tiona, Lacey and Kinzua districts.	
Price depends on lengths of pipe line haul to plant at Oil City.	

PURE OIL CO.
(Effective Feb. 24, 1937)

Cabin Creek, W. Va.	2.37
Bradford Hollow, W. Va.	2.37
Kelly Creek, W. Va.	2.37

Canada

Ontario (Sept. 9, 1933)*	
Petrolia	$2.16
Oil Springs	2.17
Turner Valley, Alberta province (Dec. 16, 1936):†	
Clear naphtha	$2.60
Discolored naphtha, 65 gravity and higher	2.36
Discolored naphtha and crude oil, 40-40.9 gravity	1.55
Increasing 3 cents for each degree of gravity with top price for 64-64.9 gravity	2.37

These prices delivered field tankage.
*Imperial Oil, Ltd.
†Imperial Oil, Ltd., and Regal Oil & Refining Co. On crude oil alone British American Oil Co. posted above prices on December 9, 1936.

Mexico

Panuco*	$1.24

*In U. S. Currency, f.o.b. ship, based on February spot market transactions.

Rocky Mountain Runs

Production estimates for the week ending March 20 were as follows:

WYOMING

	Bbls.
Salt Creek	16,200
Big Muddy	1,410
Byron	2,780
Frannie	2,110
Garland	2,450
Grass Creek	1,450
Hamilton dome	1,230
LaBarge	1,020
Lance Creek	12,130
Lost Soldier	1,130
Medicine Bow	2,400
Oregon Basin	2,600
Osage	670
Quealy dome	670
Rock River	3,120
Miscellaneous	2,170
Total Wyoming	53,540

MONTANA

Buckley Border	200
Cat Creek	560
Cut Bank	9,700
Kevin-Sunburst	4,150
Lake Basin	30
Pondera	1,190
Total Montana	15,830

COLORADO

Iles dome	3,710
Moffat	400
Miscellaneous	610
Total Colorado	4,720

NEW MEXICO

Cooper	7,270
Eaves	1,080
Eunice	30,590
Hardy	910
Hobbs	21,620
Jal	1,540
Langlie	1,210
Lynch	900
Mattix	950
Monument	28,030
Penrose	1,670
Skelly	1,100
South Eunice	1,060
Artesia	3,310
Getty	500
Rattlesnake	800
Miscellaneous	680
Total New Mexico	103,220
Total Rocky Mountain region	177,310

Texas Wildcats

(Continued from Page 229)

Ungren & Frazier et al No. 1 Snyder, 3 mi. SW Sedwick, sec. 26, L.A.L. Sur. Drlg. 3,110 ft.

Stephens County

W. T. Garret et al No. 1 Echols, 6 mi. SE of Ivan, W½, sec. 10, Blk. 3, S.P.R. R. Sur. Sand 3,865-73 ft.; tested 16,750,000 ft. gas; cementing 5-in.

Mudge Oil Co. No. 1 S. H. Hill, 3 mi. SW Eliasville, sec. 1,122, T.E.&L. Sur. Drlg. 2,210 ft.

Tarrant County

E. E. Hoffpauir et al No. 2 W. H. Davis, 2 mi. S Arlington, H. Blackwell Sur. Drlg. 2,020 ft.

Taylor County

Dunn & McAlister No. 1 Bowles, NE cor. county, SW¼ sec. 28, B.A.L. Sur. O.W. D.D.; sdy. L. 1,758-52 ft.; good S.O.&G.; S.D.

Golden Pet. Co. No. 1 C. B. Braune, sec. 15, League 144, Guadalupe Co. School Lands Sur. M.I.R.

Hal Hughes et al No. 1 Manahan, 5 mi. S Abilene, sec. 14, L.A.L. Sur. S.D. 765 ft.

Crude Prices by Gravities

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Oklahoma-Kansas	Oklahoma-Kansas	North and Central Texas	East Central Texas (Mexia district)	North Louisiana-Arkansas	Gray County, Texas	Hutchinson-Carson counties, Texas	Rodessa, Louisiana-Texas and Panola County, Texas	Conroe, Tomball, Raccoon Bend, Satsuma, Texas	Gulf Coast	Gulf Coast	West Texas except Pecos County, Lea County, N. Mex.	Mirando district, Texas	Marion County, Texas	Government Wells, Texas	Anahuac, Texas	White Castle, Louisiana	Iowa, Louisiana	Cayuga, Texas
Below 18	....	....	....	....	....	....	....	....	....	$.90	....	....	....	....	....	....	....	....	....
18-18.9	....	....	....	....	....	....	....	....	....	.92	....	....	....	....	....	....	....	....	....
19-19.9	....	....	....	....	....	....	....	....	....	.94	....	....	....	....	....	$.92	$.94	$.84	....
20-20.9	....	....	....	....	....	....	....	....	....	.96	$.95	....	$.90	....	$.90	.94	.96	.86	....
21-21.9	....	....	....	....	....	....	....	....	....	.98	.98	....	.93	....	.93	.96	.98	.88	....
22-22.9	....	....	....	....	....	....	....	....	....	1.01	1.01	....	.96	....	.96	.98	1.01	.91	....
23-23.9	....	....	....	....	....	....	....	....	....	1.04	1.04	....	.99	....	.99	1.00	1.04	.94	....
24-24.9	....	....	....	....	....	....	....	....	....	1.07	1.07	....	1.02	....	1.02	1.02	1.07	.97	....
Below 25	....	$.98	....	....	$.90	....	....	$.93	....	....	....	....	....	$.90	....	....	....	....	$.88
25-25.9	....	1.00	....	....	.92	....	....	.95	....	1.10	1.10	$.78	1.05	.92	....	1.04	1.10	.99	.90
26-26.9	....	1.02	....	....	.94	....	....	.97	....	1.13	1.13	.80	1.08	.94	....	1.06	1.13	1.03	.92
27-27.9	....	1.04	....	....	.96	....	....	.99	....	1.15	1.15	.82	1.10	.96	....	1.08	1.15	1.05	.94
28-28.9	....	1.06	....	....	.98	....	....	1.01	....	1.17	1.17	.84	1.12	.98	....	1.10	1.17	1.07	.96
Below 29	$1.06	....	$.96	$1.03	....	....	....	....	$1.20	....	....	....	....	....	....	....	....	....	....
29-29.9	1.08	1.08	.98	1.05	1.00	....	....	1.03	1.22	1.19	1.19	.86	1.14	1.00	....	1.12	1.19	1.09	.98
30-30.9	1.10	1.10	1.00	1.07	1.02	....	....	1.05	1.24	1.21	1.21	.88	1.16	1.02	....	1.14	1.21	1.11	1.00
31-31.9	1.12	1.12	1.02	1.09	1.04	....	....	1.07	1.26	1.23	1.23	.90	1.18	1.04	....	1.16	1.23	1.13	1.02
32-32.9	1.14	1.14	1.04	1.11	1.06	....	....	1.09	1.28	1.25	1.25	.92	1.20	1.06	....	1.18	1.25	1.15	1.04
33-33.9	1.16	1.16	1.06	1.13	1.08	....	....	1.11	1.30	1.27	1.27	.94	1.22	1.08	....	1.20	1.27	1.17	1.06
34-34.9	1.18	1.18	1.08	1.15	1.10	....	....	1.13	1.32	1.29	1.29	.96	1.24	1.10	....	1.22	1.29	1.19	1.08
Below 35	....	....	....	....	....	$.96	$.91	....	....	....	....	....	....	....	....	....	....	....	....
35-35.9	1.20	1.20	1.10	1.17	1.12	.98	.93	1.15	1.34	....	....	1.31	.98	1.26	1.12	....	1.24	....	1.10	....
36-36.9	1.22	1.22	1.12	1.19	1.14	1.00	.95	1.17	1.36	....	....	1.33	1.00	1.28	1.14	....	1.26	....	....	....
37-37.9	1.24	1.24	1.14	1.21	1.16	1.02	.97	1.19	1.38	....	....	1.35	1.02	1.30	1.16	....	1.28	....	....	....
38-38.9	1.26	1.26	1.16	1.23	1.18	1.04	.99	1.21	1.40	....	....	1.37	1.04	1.32	1.18	....	1.30	....	....	....
39-39.9	1.28	1.28	1.18	1.25	1.20	1.06	1.01	1.23	1.42	....	....	1.39	1.06	1.34	1.20	....	1.32	....	....	....
40 and over	1.30	1.30	1.20	1.27	1.22	1.08	1.03	1.25	1.44	....	....	1.41	1.08	1.36	1.22	....	1.34	....	....	....

Column 1—Companies posting are Barnsdall, Bell, Champlin, Continental, Cushing, Derby, Dickey, Eason, El Dorado, Empire, Falcon, Globe, Gulf, Johnson, Kanotex, National, Phillips, White Eagle, Stanolind, Sunray, Texas, Sun, Vickers and Wilcox.
Column 2—Anderson & Prichard, Carter, Cosco, Deep Rock, Magnolia, Mid-Continent, Pure, Rock Island, Shell, Sinclair, Skelly and Tide Water.
Column 3—All purchasers.
Column 4—Humble Oil & Refining Co. and Sinclair Crude Oil Purchasing Co.
Columns 5, 6, 7 and 8—All purchasers.
Column 9—Humble Oil & Refining Co. and Sun Oil Co. Tide Water Oil Co.'s schedule starts at 35 degrees, $1.34 with 2-cent spread up to 40 and over at $1.44. (Raccoon Bend prices are for deep sand oil.)
Column 10—The Texas Co. (Gulf Refining Co. pays same prices up to and including 34 gravity, but continues its 2-cent spread up to 40 and over at $1.41.)
Column 11—Humble Oil & Refining Co., Sinclair Prairie Oil Marketing Co., Sun Oil Co.
Column 12—All purchasers.
Column 13—Humble Oil & Refining Co.
Column 14—Magnolia Petroleum Co.
Column 15—Sun Oil Co.
Column 16—Gulf Refining Co.
Column 17 and 18—Shell Petroleum Corp.
Column 19—Tide Water Oil Co.

MARKET RECORD, ACTIVE OIL STOCKS

Compiled by Carl M. Pforzheimer & Co., 25 Broad Street, New York City, Members New York Stock Exchange and New York Curb Exchange

New York Stock Exchange

1937 High	1937 Low	Week ended Mar. 20 Sales	High	Low	Close	Stocks—	Total shares outstanding	Par value	Latest dividend	Payable or last paid	Dividends paid in 1936	1936 High	1936 Low	1935 High	1935 Low
114⅞	101	2,600	113	105¼	107	Amerada Corp.	788,675	N.P.	50cQ	1-30-37	$2.00	125½	75	80	48½
37	30⅛	12,100	35⅝	32⅞	33⅜	Atlantic Refining	2,664,904	$25	25cQ	3-15-37	1.25	35⅛	26⅝	28	20½
43⅜	35⅞	16,300	42⅝	39¼	39⅜	Barber Co.	387,149	$10	50c	12-10-36	.50	38½	21	22½	11¾
35¼	26⅛	15,600	32¾	31	31	Barnsdall Oil Co.	2,131,090	$5	25cQ	5-1-37	.80	28¼	14⅛	14¾	5⅞
20⅞	16½	55,300	17¼	16½	16⅞	Columbia Gas & Elec.	11,610,036	N.P.	20c	11-16-36	.40	23⅜	14	15¾	3⅜
17¾	15⅝	70,400	17½	16¼	16¼	Consolidated Oil Corp.	13,983,287	N.P.	20cQ	5-15-37	.80	17¼	11½	12¼	6½
45½	40¼	16,700	44½	41	41¼	Continental Oil of Delaware	4,682,671	$5	25cQ	3-29-37	1.50	44⅞	28⅛	35	15⅛
17⅝	12½	17,900	15⅞	14½	14⅝	Houston Oil (new)	1,098,618	$25	....	10-17-30	....	13⅞	6⅜	7	1½
35⅜	29¼	11,400	34⅜	31⅞	32	Mid-Continent Petroleum	1,843,872	$10	75cSA	12-1-36	1.15	30⅞	17¼	20½	9½
33	26⅞	4,700	32½	29	29	Mission Corporation	1,399,345	N.P.	....	.....	.45	29⅞	16¾	17¾	10⅜
89½	62	9,000	89½	81¼	85	National Supply of Delaware	382,591	$25	....	5-15-31	....	75½	19⅞	20⅞	9
22½	17⅛	56,700	22¼	20¼	20⅜	Ohio Oil Co.	6,563,377	N.P.	35cSA	12-15-36	.60	18	12⅛	14¼	9¼
29	22¼	2,700	28⅛	26½	26½	Pacific Western Oil	1,000,000	N.P.	65c	12-18-36	.65	23½	11¾	14	6¾
4½	2¾	6,000	3⅞	3¼	3⅜	Panhandle P. & R.	198,770	N.P.	....	.....	....	4¼	1⅜	1⅞	½
58½	49½	18,900	57¾	54¼	55	Phillips Petroleum	4,152,836	N.P.	50cQ	3-1-37	2.50	52¾	38⅛	40	13¾
27⅝	24⅝	20,100	26¾	24¾	25	Plymouth Oil Co.	1,050,000	$5	35cQ¶	3-31-37	.90	27¾	11⅞	13	6½
24⅜	19½	36,100	22⅛	20½	20½	Pure Oil Co.	3,038,370	N.P.	....	9-1-30	....	24⅞	16	17	5⅞
48½	40¼	11,300	48½	44⅞	47½	Seaboard Oil of Delaware	1,244,283	N.P.	25cQ	3-15-37	1.00	44	30½	36⅞	20¾
34¾	26⅞	6,500	33⅛	30⅞	31¼	Shell Union Oil	13,070,625	N.P.	25c	12-15-36	.25	28¼	14¾	16½	5½
105⅜	102¼	1,600	103¾	102	102	Shell Union Oil 5½% pfd.	400,000	$100	26⅛c	12-15-36	28.87½	127½	102	111	63⅛
4⅛	3½	2,000	4	3¾	4	Simms Petroleum	461,698	$10	50c liq.	1-9-37	2.25 liq.	6¾	3½	18¾	4¾
52⅜	42	5,800	51¾	48⅜	49½	Skelly Oil	1,008,514	$15	....	12-15-30	....	47⅜	19½	20½	6½
19½	16¼	72,500	19	18¼	18⅝	Socony-Vacuum	31,151,075	$15	25cSA	3-15-37	.70	17½	12½	15¾	10⅝
50	43¼	17,400	48½	45½	45¾	Standard Oil of California	13,014,754	N.P.	30cQ¶	3-15-37	1.20	47⅝	35	41⅛	27¾
50	46	17,200	48¼	46	46½	Standard Oil (Indiana)	15,215,677	$25	40cQ¶	3-15-37	2.40	48½	32¾	33⅜	23
32	31	200	32	32	32	Standard Oil of Kansas	200,000	$10	$1	12-26-36	1.00	31	25	32	20
76	67¾	30,000	74	70⅜	70⅝	Standard Oil of New Jersey	25,856,081	$25	$1.25SA¶	12-15-36	2.00	70⅜	51⅛	52⅜	35¾
77½	71	700	73	71	72	Sun Oil	1,733,013	N.P.	25cQ	3-15-37	$1 & 6% Stk.	91	70	77	60½
60	50¾	94,700	58⅛	56⅜	57⅞	Texas Corp.	9,340,069	$25	50cQ	4-1-37	1.50	55¼	28⅞	30¼	16½
9⅝	7⅞	50,200	9⅝	8¾	9	Texas Gulf Producing Co.	888,113	N.P.	5c	12-15-36	.05	8⅞	4⅜	4⅜	2½
15⅝	13⅛	19,300	16¼	15	15	Texas Pacific Coal & Oil	880,703	$10	10c	3-1-37	.25	15¼	7½	9¼	3¼
21⅝	19¾	11,600	21⅛	19¾	20	Tide Water Associated	5,642,342	N.P.	15cQ	3-1-37	.70	21¾	14⅜	15⅞	7⅝
108	105¼	1,600	106⅜	106⅛	106⅜	Tide Water Associated pfd.	626,221	$100	$1.50Q	1-2-37	6.00	106½	100⅝	104½	84
28¼	24⅞	16,100	26⅝	25⅜	25½	Union Oil of California	4,386,070	$25	25cQ	11-10-36	1.00	28½	20¾	24	14¾
31½	26⅝	1,900	29	28	28⅝	Union Tank Car Co.	1,200,000	N.P.	40cQ	3-1-37	1.20	31⅝	22⅝	26½	20⅞
6¼	4½	5,700	5⅞	5⅜	5½	Wilcox Oil & Gas	424,839	$5	....	5-10-28	....	5¼	2¾	3⅛	1

*Ex-dividend. †Plus extras ‡Also 50 per cent in stock of Barnsdall Ref. §Partly on account of accumulation. ‖Dividend 4/75 Mission Corp. paid 3-15-35. ¶Includes extras.
**Plus 6% stock.

New York Curb Exchange

1937 High	1937 Low	Week ended Mar. 20 Sales	High	Low	Close	Stocks—	Total shares outstanding	Par value	Latest dividend	Payable or last paid	Dividends paid in 1936	1936 High	1936 Low	1935 High	1935 Low
21⅜	16¾	1,400	17⅝	16¾	17¼	Bridgeport Machine Co.	260,000	N.P.	$1	12-21-36	$1.00	21	13¼	14⅛	3¾
49½	46	250	49	48	48¾	Buckeye Pipe Line Co.	200,000	$50	$1Q	3-15-37	3.25	50	39¾	42½	30½
2¾	2⅛	31,100	2¾	2¼	2½	Carib Syndicate	799,020	25c	....	.....	....	4⅞	1⅞	4¼	1⅝
115	110¼	100	113	113	113	Chesebrough Mfg. Co.	120,000	$25	$1.50Q†	3-29-37	7.00	124¾	105	157	115
5⅜	4	184,000	5	4⅛	4½	Cities Service	37,804,394	N.P.	....	6-1-32	....	7⅜	3	3¼	¾
4⅝	2⅝	7,900	2⅞	2⅝	2⅝	Cosden Oil	399,687	$1	....	.....	....	4½	1½	1½	¼
38	31⅞	5,900	34¼	32	32	Creole Petroleum	6,974,356	$5	25cSA	12-15-36	.50	39	19⅞	23¾	10
18⅝	16	800	16¾	16⅛	16½	Darby Petroleum	351,390	$5	25cSA	1-15-37	.50	18⅛	9	8⅞	4
7⅞	5¼	1,200	6½	6⅛	6½	Derby Oil & Refining	263,162	N.P.	....	.....	....	6¾	1⅞	2	¾
47¼	46½	100	40	40	40	Eureka Pipe Line	50,000	$50	$1Q	11-2-36	4.00	47½	38½	38	33¼
63½	56	8,700	58⅞	56	56¼	Gulf Oil Corp.	9,076,202	$25	25cQ	4-1-37	1.50, 100% Stk.	59	36	74¾	50¼
87	77½	4,200	83¾	80⅝	80⅝	Humble Oil & Refining	8,923,935	N.P.	37½cQ	4-1-37	1.50	80	57	64	44
24¼	21	4,100	23⅞	23⅛	23⅛	Imperial Oil of Canada	26,919,871	N.P.	62½cSA†‡	12-1-36	1.25	24½	19¾	22½	15⅜
15	7¾	3,500	15	14⅜	14⅝	Indiana Pipe Line	300,000	$10	30cSA	5-15-37	.80	9¾	5½	6⅛	3⅝
39½	33¾	9,400	37¾	36¼	36⅜	International Petroleum	14,247,088	N.P.	$1.25†‡	12-1-36	2.50	39⅝	32⅝	39¾	28
15¼	12⅛	4,200	13¼	12⅜	12⅜	Louisiana Land & Exp.	3,000,000	N.P.	10cQ	3-15-37	.50	15⅜	9⅞	11⅜	4⅜
19⅞	16¼	23,700	19⅞	16¾	19¼	Lion Oil Refining	270,000	N.P.	25cQ	12-26-36	.75	17¾	7⅜	8⅛	3½
14¼	11½	2,900	12⅜	11¼	11¼	Lone Star Gas	5,382,723	N.P.	20c	4-20-37	.60	14¼	9⅞	10⅞	4½
7⅞	6	2,500	7	6¾	6¾	Mountain Producers	1,682,182	$10	30cSA	12-21-36	.60	8⅜	5	5¾	4⅛
19½	16¾	2,400	17	16¾	17	National Fuel Gas	3,810,183	N.P.	25cQ	1-15-37	1.00	23	17⅜	20	11¾
11⅞	10	1,100	11¼	11	11¼	National Transit	500,000	$12.50	35cSA	12-15-36	.75	15¾	9¼	10⅝	6¾
6	4⅜	No sales ..	..	..	..	New Bradford Oil	1,445,202	$5	15cSA	4-15-37	.10	4⅝	2⅞	3¼	2
5	3½	700	3½	3½	3½	New Mexico and Arizona	1,000,000	$1	1c	12-1-36	.01	6⅝	1⅝	2½	1
11⅞	10	500	5	5	5	New York Transit	100,000	$5	15cSA	10-15-36	.35	6¼	4¼	4⅞	3
10¾	7½	1,700	10¾	10¼	10¾	Northern Pipe Line	120,000	$10	35c	1-2-37	.40	9¾	4⅞	8	5¼
9⅜	6¼	30,100	6⅞	6¼	6¼	Pantepec Oil	1,608,700	N.P.	....	.....	....	10⅛	3¼	4⅜	1¼
13¾	9½	2,400	9⅞	9½	9⅝	Root Petroleum Co.	336,045	$1	25c	11-2-36	.50	19¼	4½	5	1½
6½	4¼	2,300	5	4⅜	4⅜	Ryan Consolidated	296,931	N.P.	....	.....	....	4¾	1⅞	2½	⅝
48	44	500	46½	45	45	South Penn Oil	1,200,000	$25	60cQ†	3-29-37	2.60	44	32½	34½	21⅝
6⅝	5	800	7¼	6½	6⅞	Southern Pipe Line	100,000	$10	20cSA	3-1-37	.25	7⅞	3¼	5	3⅞
42	38	No sales ..	..	..	..	South West Penna. Pipe Lines	35,000	$50	50cQ	4-1-37	13.00	60	44	56	44¼
20⅜	19¼	7,500	20½	19¾	20½	Standard Oil of Kentucky	2,604,790	$10	25cQ	3-15-37	1.35	23⅜	17⅛	24	18
13½	11½	No sales ..	..	..	..	Standard Oil of Nebraska	188,403	$25	25c	3-29-37	.25	14⅝	11	12	7¾
45	33¼	4,800	44⅜	43	43½	Standard Oil of Ohio	753,740	$25	25cQ	3-15-37	2.00	40	21¾	23⅝	11½
4⅞	4	1,500	4⅜	4½	4½	Sunray Oil	1,910,919	$1	5c	4-26-37	.10	5	2⅝	2⅞	⅞
7⅝	6⅛	2,200	6⅞	6½	6½	Texon Oil & Land	336,028	$2	15cQ	3-31-37	.60	9¾	5⅜	6⅞	5

*Ex-dividend. †Includes extras. ‡Payable in Canadian funds. §New stock.

Note—In comparing highs and lows for the several years in the two tables, it will be necessary to take into consideration cases where there have been stock split-ups.

Oil Man's Calendar

April

1-2—Dallas, Tex., American Petroleum Institute, Southwestern District, Division of Production, Baker Hotel.

7-8—Boston, Mass., Oil Men's Association of New England, thirteenth annual convention, Copley Plaza Hotel.

7-9—Birmingham, Ala., American Institute of Mining and Metallurgical Engineers, Open Hearth Conference.

8-10—Shreveport, La., Petroleum Industry Electrical Association.

13—Los Angeles, Calif., American Petroleum Institute, Division of Production, Pacific Coast district, Biltmore Hotel.

15-16—Cleveland, Ohio, 34th semiannual meeting National Petroleum Association, Cleveland Hotel.

26-28—Hot Springs, Ark., Western Petroleum Refiners Association, annual meeting, Arlington Hotel.

May

4-9—White Sulphur Springs, W. Va., Society of Automotive Engineers, summer meeting, Greenbrier Hotel.

6-7—Columbus, Ohio, American Petroleum Institute, Division of Production, Eastern district, Deshler-Wallick Hotel.

10—Kansas City, Mo., Spring meeting Natural Gas Department, American Gas Association.

19-21—Tulsa, Natural Gasoline Association of America, annual meeting, Hotel Tulsa.

23-27—Pittsburgh, Pa., National Association of Purchasing Agents (Oil Company Buyers' Group) annual convention, William Penn Hotel.

June

1-3—Colorado Springs, Colo., American Petroleum Institute, mid-year meeting, Broadmoor Hotel.

7—Kansas City, Mo., Oil Field, Gas Well-Refinery Workers of America.

10-12—Pennsylvania Grade Crude Oil Association, annual meeting, on Great Lakes S.S. "Seeandbee," sailing from Buffalo, N. Y.

11—Santa Fe, N. M., Interstate Oil Compact Commission meeting.

14-19—Paris, France, Second World Petroleum Congress, during International Exposition.

25-26—Dallas, Tex., National Oil Scouts Association, annual meeting, Baker Hotel.

June—July

28-July 2—New York, American Society for Testing Materials, fortieth annual meeting, Waldorf-Astoria Hotel, together with fourth A.S.T.M. exhibit of testing apparatus and related equipment.

September

(?)—San Francisco, Calif., North American Gasoline Tax Conference.

27—Cleveland, Ohio, American Gas Association, nineteenth annual convention.

October

11-16—Houston, Tex., Oil-World Exposition.

26—New York, Oil Trades Association of New York.

29-30—Dallas, Tex., Mid-Continent Oil and Gas Association of Texas, annual meeting.

November

9-12—Chicago, American Petroleum Institute, eighteenth annual meeting, Stevens Hotel.

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5 Lines	*1.75*	*3.00*	*4.25*	*5.50*	*9 Lines*	*3.15*	*5.40*	*7.65*	*9.90*
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Tulsa, Oklahoma

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TULSA, OKLAHOMA

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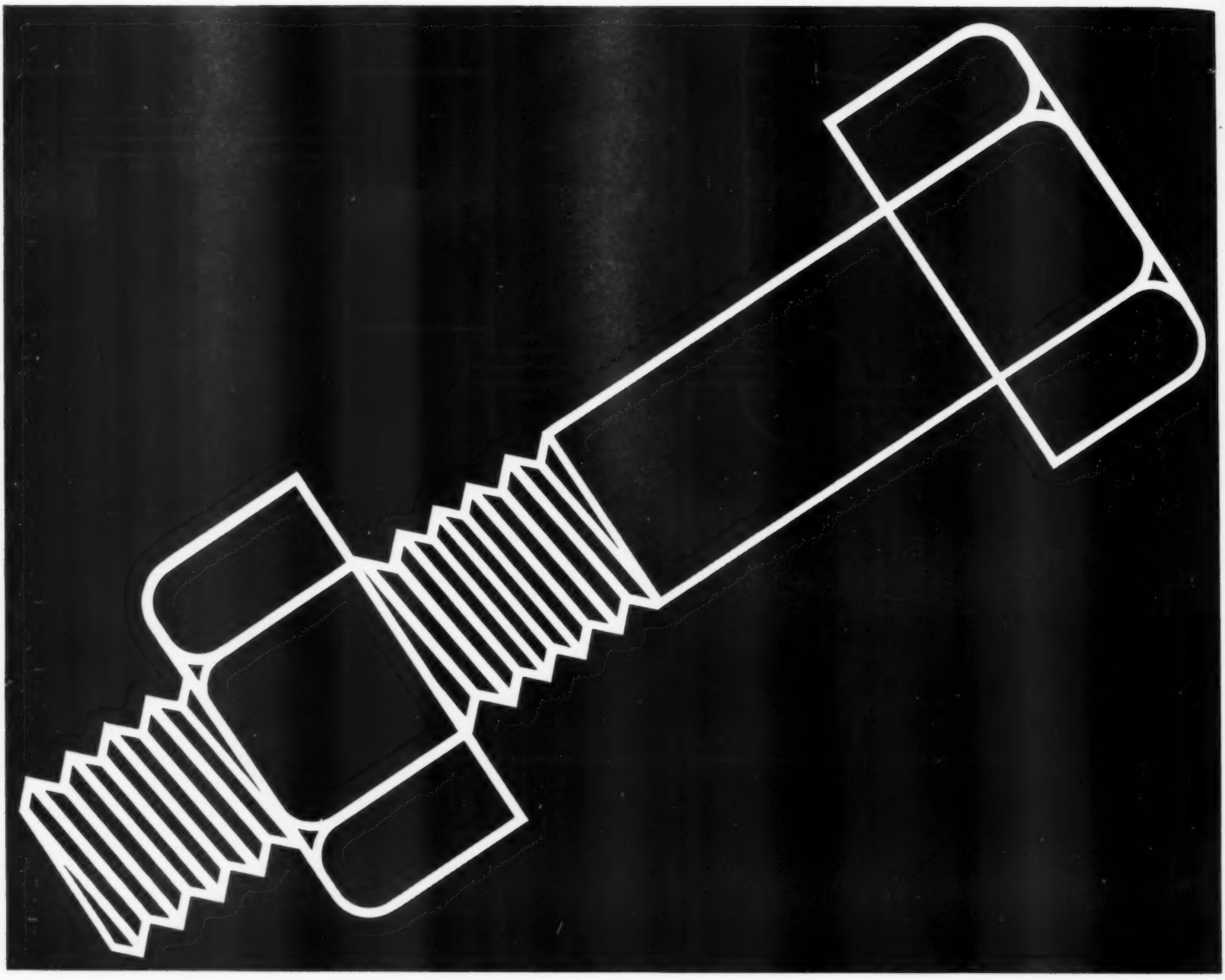

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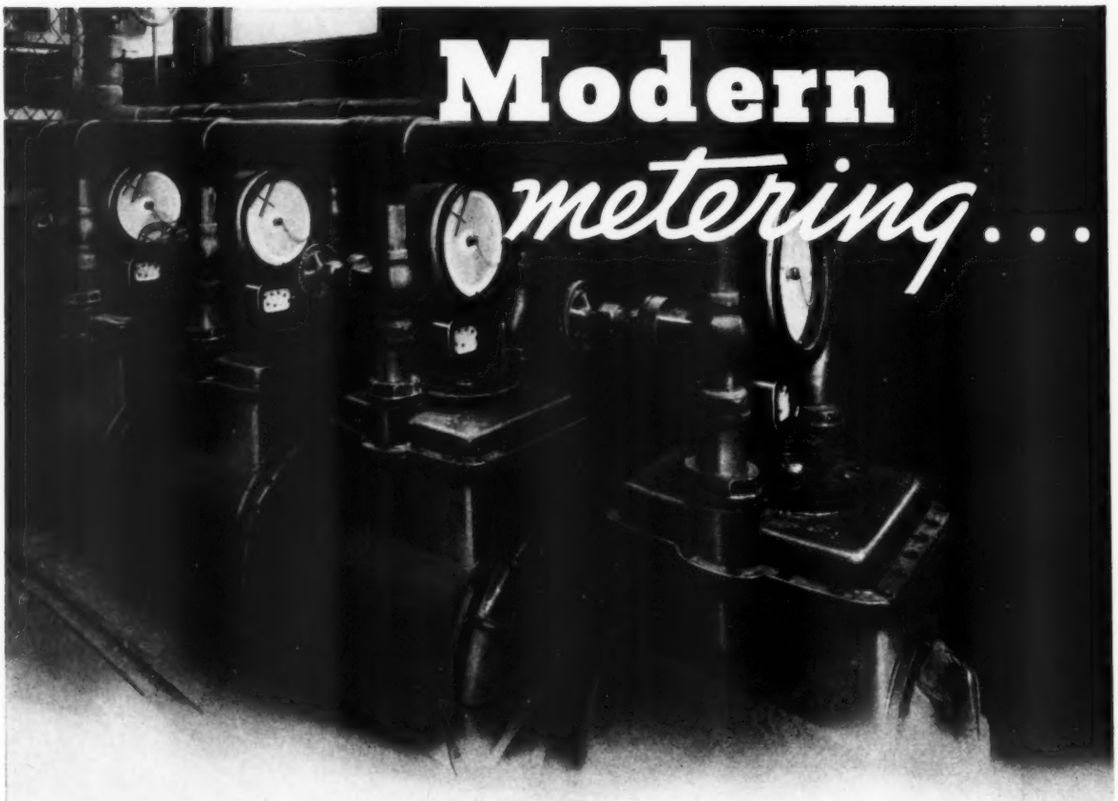
The Oil and Gas Journal, issued weekly by The Petroleum Publishing Company, 114-116 West Second Street, Tulsa, Oklahoma. Subscription prices: Domestic, $6.00 a year; foreign, $7.00 a year. Entered as second-class mail matter December 15, 1911, at the post office at Tulsa, Oklahoma, under the Act of March 3, 1879.

Modern *metering* . . .



BATTERY OF FOUR METRIC IRONCASE METERS installed at the Mueller Brass Company, on the lines of the Detroit Edison Company of Port Huron. The four Ironcase 60-B Type Meters here utilized have a capacity of 950 cu. ft. each per hour at ½" loss, and 2000 cu. ft. each at 2" loss of water.

METERS SET UP in parallel, as here shown, offer important advantages in industrial gas measurement. An uninterrupted, complete chart record of the load is insured . . . permitting the proving of meters, one at a time, or even cutting out any meter from the line for overhauling. Each meter is equipped with a Westcott Volume and Pressure Gage, which charts hourly rate of gas flow and pressure.

Metric Ironcase Meters in sizes 5-B to 500-B, include types to meet both the usual and the unusual in service requirements . . . each type designed specifically for the work intended to be performed. The processed one-piece body construction not only brings additional strength, safety and corrosion resistance. It also eliminates internal leaks.

To achieve and **MAINTAIN** the high Metric standard of accuracy, the friction loss is held to a minimum . . . by valves of perfected design and precision movement . . . improved bearings, lubrication methods and stuffing boxes . . . specially developed diaphragm construction and operation. Metric Ironcase design utilizes the slide valve and full bellows principle . . . your assurance of reliable performance throughout the Metric line.

The operating advantages of Metric Ironcase Meters are detailed in Catalog EG-40 . . . mailed upon your request.

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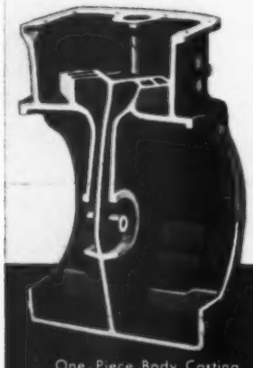

One-Piece Body Casting, Eliminating Internal Leaks

Established 1836

AMERICAN METER COMPANY

INCORPORATED

METRIC METAL WORKS *ERIE, PENNSYLVANIA*